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ABSTRACT

This handbook provides a short, simple, non-academic, and practical guide on instruction in an on-the-job setting. It teaches job instructors the skills, knowledge, and techniques necessary to carry out job training in vocational and technical areas. Part 1 focuses on elements present in the job instruction setting that must be weighed to maximize learning--training process, learning process, mechanics of learning, learner, and job instructor. Part 2 discusses communications, motivation, and human relations factors relevant to the job instructor. Part 3 presents 10 principles of good job instruction and discusses how they lead to the step-by-step process of job training. Part 4 is an overview of instructional methods, techniques, and aids. Each method is defined, and advantages, disadvantages, uses, and standard format are provided. Part 5 describes aids that could assist instructors in a wide range of vocational training tasks. The focus of part 6 is how to tackle job instruction in a logical manner. Topics are preparation, job breakdowns, training task breakdowns, and attitudinal training. Part 7 discusses the best methods of confirming that the learner has met the desired standard and basic reporting and recording requirements. (YLB)

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ON-THE-JOB TRAINING

-A GUIDE FOR INSTRUCTORS-

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PREFACE

This 'Guide For Instructors' continues the work carried out over the years in the field of instructor training. Various training agencies have been and are still involved, and this guide for instructors is intended to operate in parallel, particularly with programmes of the Industrial Training Service, which conducts in-company programmes as part of the overall Training Within Industry operation.

The use of this guide is a starting point to help people improve their job-instructional techniques. A wide range of concepts, skills and knowledge are presented. Further information is available from other agencies, such as Toastmasters, Skills Project, Teacher Training Unit, New Zealand Institute of Management, New Zealand Council of Adult Education, Polytechnics, and Community Colleges throughout the country.

The guide contains three major elements. First, a proven sequence of steps to be followed in developing job related training. Second, a set of critical elements of job instruction. often ignored by most instructors when designing and using their materials. Third, an answer to the critical question, "Why do we need training for job instructors?" It is the integration of these three elements, the design process, the critical elements of on-the-job instruction, and the answers to a number of problem questions facing the new job-instructor - which makes this book appealing.

One other point which will be of interest to the reader. The book has been written to exemplify the principle "practise what you preach while you preach it". THE AIM OF THIS BOOK is to provide a short, simple practical guide on how to instruct on-the-job and how to organise the instruction. We have therefore presented material to assist both the part-time and full-time job instructor, recognising the former's difficulty through instructing being a part-time occupation.

We hope you find this publication a useful source of reference in your job.

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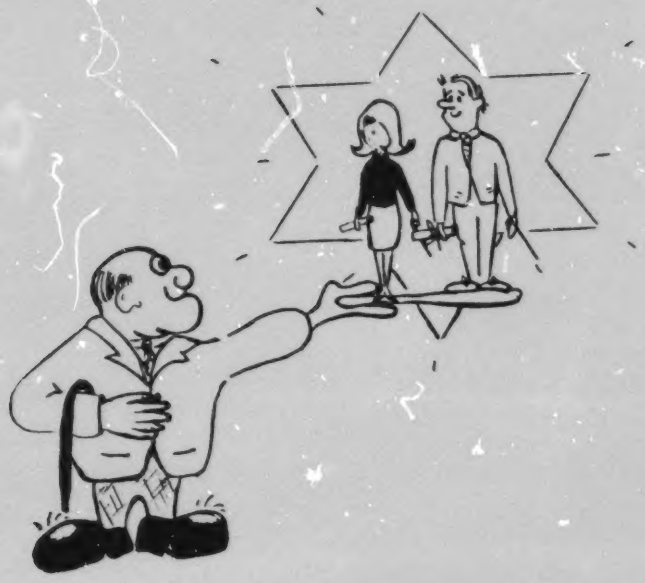
INTRODUCTION



THE AIM OF THIS HANDBOOK

The aim of this handbook is to provide a short, simple non-academic, and practical guide on how to instruct in an on-the-job setting. It recognises the wisdom in the statement "there is often more in training someone else to do the job, than there is in doing it yourself". Its truth is perhaps best demonstrated when indentured tradespeople, concerned mainly with production, find themselves with an apprentice in their charge.

THE AIM OF ON-THE-JOB TRAINING

The principle and ultimate aim of all instruction associated with on-the-job training, is to ensure a person becomes COMPETENT IN A CHOSEN VOCATION. This is essential for the success of a business or organisation employing the person receiving training, and to meeting the job satisfaction requirement of an employee.

THE ROLE OF THE JOB-INSTRUCTOR

With this ultimate aim clearly in mind, the job instructor is to do all that can reasonably be expected, to ensure the trainee becomes competent. A master of the tools and techniques of their trade.

This can only be achieved if the instructor is competent, skilled and knowledgeable, and unsparing in effort. Above all the training task must always be viewed through

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the eyes of the learners:

HOW WILL THEY LEARN THIS TASK BEST?

Always remember -

"The job instructor has only been successful when the person being trained has absorbed the knowledge and skill, and can demonstrate it in practice."

SUCCESS DEPENDS ON YOU
THE JOB INSTRUCTOR

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AN OVERVIEW

There will always be a need for effective instructional techniques in teaching job related skills. With current predictions of the job market showing an increased demand for individuals with highly developed skills, it is necessary for you, the Job-Instructor, to be both efficient and effective in the training role.

The aim of this Handbook is to provide you with the skills, knowledge and techniques necessary to carry out job training in vocational and technical areas. When you have read and practised the activities in this book, you will have completed a study of the following.

1. The elements present in the job instruction setting that must be weighed to maximise learning.
2. Communications, Motivation and Human Relations factors relevant to the job-instructor.
3. The ten principles of good job-instruction and how this leads to the step-by-step process of job training.
4. The various methods and techniques you can apply to become an effective instructor.
5. Aids that could assist instructors in a wide range of vocational training tasks.
6. How to tackle the job-instruction in a logical manner.
7. The best methods of confirming the learner has met the desired standard, and basic reporting and recording requirements.

This handbook will take you through the material needed to master each of these components. Hence the book will be divided into seven parts. An overview of the components of the seven parts is shown on page 4.

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AN OVERVIEW: COMPONENTS OF THE JOB INSTRUCTION GUIDE

PART 1

ELEMENTS PRESENT IN THE JOB-INSTRUCTION SETTING

1. The Training Process
2. The Learning Process
3. The Mechanics of Learning
4. The Learner
5. The Job-Instructor

PART 2

COMMUNICATIONS, MOTIVATION AND HUMAN RELATIONS

1. Communications: An instructor's tool of trade
2. Motivation and Human Relations

PART 3

TEN PRINCIPLES OF GOOD JOB-INSTRUCTION

1. Brief introduction to job-instruction
2. Set the aim
3. Plan and prepare
4. Present new information in sequential steps
5. Maintain interest
6. Use the correct senses
7. Create an active environment
8. Keep it simple
9. Confirm at each stage
10. Allow learners to proceed at their own rate

PART 4

INSTRUCTIONAL METHODS

1. Which Method?
2. The Theory Lecture Method
3. The Theory Lesson Method
4. The Demonstration
5. The Practical Lesson
6. Individual Instruction
7. The Discussion
8. Programmed Learning
9. Questions and Revision
10. Using Your Voice

PART 5

AIDS TO THE JOB-INSTRUCTION

1. Range of aids
2. How do aids help a learner?
3. Notes and precis

PART 6

TACKLING THE JOB-INSTRUCTION

1. Preparation
2. How to make a Job Breakdown
3. How to make a Training Task Breakdown
4. Attitudinal Training
5. Self Preparation

PART 7

CONFIRMING, RECORDING AND ADMINISTERING THE JOB TRAINING

1. Confirmation
2. Fault recognition and analysis
3. Administration associated with job-instruction

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we are here

ELEMENTS PRESENT IN THE JOB-INSTRUCTION SETTING

COMMUNICATIONS, MOTIVATION AND HUMAN RELATIONS

TEN PRINCIPLES OF GOOD JOB-INSTRUCTION

INSTRUCTIONAL METHODS

AIDS TO THE JOB-INSTRUCTION

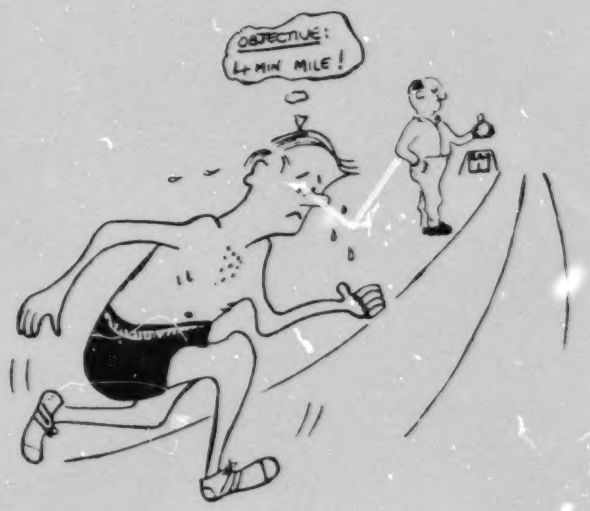
TACKLING THE JOB-INSTRUCTION

CONFIRMING, RECORDING AND ADMINISTERING THE JOB TRAINING

PART I

ELEMENTS PRESENT IN THE JOB–INSTRUCTION SETTING

1. The Training Process
2. The Learning Process
3. The Mechanics of Learning
4. The Learner
5. The Job-Instructor



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1 THE TRAINING PROCESS

Introduction

As a starting point for this handbook it will be appropriate to look at the use of terms (or maybe mis-use) commonly associated with training. Training, Education and Development - is there a difference and if so, is it important to new job trainers?

A brief look into the history of training would reveal the term Training being associated with the teaching of a manual skill, this skill being tied to an economic task. Gradually the term has become accepted to include a wide variety of activities ranging from learning individual social skills to individuals pursuing new recreational interests. Nevertheless, the important distinguishing feature is that these latter activities are not *economic* and *profit* orientated.

While training is directly concerned with improving people's current performance with regard to economic activities, education is not generally thought of in these terms. Education is a term applied to a range of learning activities, in the main this does not include those orientated towards profit.

Training Development is a relatively new expression that is often used in addition to training - "Training and Development Manager". Development in this context is used to reflect the staff development function of the organisation. Education and development extend beyond the perimeters of traditional job training and deal with predicted needs.

Ivor K. Davies in his book "The Organisation of Training", makes a useful distinction between Training and Education, one which simply states, that in the:

1. Training System
   - (1) Everyone is expected to be successful
   - (2) Those who have difficulty are given further training until they do succeed.
   - (3) Those who learn quickly or more easily reach the final standard sooner and depart.
   - (4) The final standard is attainable by all.
   - (5) The end-of-course marks are all 100%.

2. Education System
   - (1) Everyone is assumed to reach a level determined to match their natural abilities.
   - (2) Those who have difficulty are redirected to other topics.
   - (3) Those who learn easily cover more of the topic or more topics.
   - (4) The final standard is expressed as a pass mark which is statistical in nature.
   - (5) The end-of-course marks range from 10% to 90%.

The above is a contrast of systems, it must not be assumed that either is better than the other. These are just two different systems of learning. However, the new Job Trainer should be aware of the fundamental principles used in both systems; these must not be applied to inappropriate situations.

Well, so much for these differences; because:

1. It is only of background interest.

2. Whatever the system; they have a common objective to develop people. Today organisations are recognising their employees have development potential and are a valuable asset, they are open to the use of all systems.

3. Knowing the difference means "you might be able to talk about it" Hopefully by the time you have completed this handbook you will be able to aid your organisation by using it!

TRAINING DEFINED

If we are going to truly appreciate the role of the On-The-Job Instructor, and accept that job training now forms an essential part of an organisation's life, we must focus on what training is. Modern training technologists and philosophers have tended to complicate the basic issues involved. We must strive to define training in simple terms that contain a complete philosophy. This is not easy; however, we come close to this ideal if we define training as:

"TRAINING IS A METHOD OF IMPROVING A PERSON'S JOB PERFORMANCE THROUGH SKILFULLY MANAGING THE LEARNING OF NEW BEHAVIOUR TO SATISFY BOTH THE ORGANISATION'S AND THE INDIVIDUAL'S GOALS."

A company does not decide to undertake training lightly. Usually it decides it has a 'people problem'. The training is based on the need for certain skills, knowledge and attitudes that can best be provided through training. Do not assume training is the sole answer. Human resources can be directed, and frequently are.

One could devote a great deal of this book to definitions of training, not only because of the importance of semantics, but because it encompasses a new look at training. Of prime importance in our definition is the *role of the individual*, our learner. If you understand this and the management role it implies for instructors, the rest of the training subjects which follow will fall into place with ease.

SUMMARY

Finally to summarise our definition:

"TRAINING IS A METHOD OF IMPROVING A PERSONS JOB PERFORMANCE THROUGH SKILFULLY MANAGING THE LEARNING OF NEW BEHAVIOUR TO SATISFY BOTH THE ORGANISATION'S AND THE INDIVIDUAL'S GOALS."

It is:

1. A Method of Improving A Persons Job Performance

   (1) A method - there are others.

   (2) A Person's - only the learner can learn for himself/herself.

   (3) Job Performance - Performance can only be truly assessed against realistic standards and conditions established for the particular job.

2. Skilfully

(1) Aim at meeting predetermined needs.

(2) Evaluate against these.

(3) Training follows a Process - diagnosis, preparation, development, implementation and confirmation - these points are discussed in detail later on in the handbook.

3. Managing the Learning

(1) Based on principles of learning and principles of effective Instructing, Planning - organising, motivating, controlling and reviewing.

(2) Learner based - what the learner must achieve at the end of the training.

(3) Constantly review with feedback.

(4) Employs a close instructor-trainee working relationship, both working towards the same goal.

4. New Behaviour

(1) The aims of training are to change behaviour on the job.

(2) Behaviour is either knowledge, skills or attitudes associated with the job; the new behaviour must be observed to have been adopted.

5. To satisfy both the Organisation's (Goals)

(1) Training effectiveness is measured in terms of its contribution to the organisation's goals.

(2) Training should be compared to alternative methods of changing performance - it must be cost effective and give a return on investment.

6. Individuals (Goals)

(1) The individual is as important as the organisation.

(2) Individuals need to learn, it's as natural as eating and sleeping.

(3) To maintain motivation individual needs must be considered as part of the overall solution where a performance problem exists.

(4) When the learner is the focus of any training measures taken, it will have a number of benefits for the organisation:
- Improved human relations.
- Pride in the organisations' products.
- Loyalty.
- Pride in one's own accomplishment.

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How and why people learn

Learning is a purely voluntary act. No person can be forced to learn. Discipline may ensure that individual listens or even takes part in the instruction, but learning and remembering defy compulsion.

Acquiring trade skills or knowledge fortunately rarely requires individuals to be compelled to learn. Generally people will happily learn if:

1. They are interested.
2. There is an incentive.
3. They see the reason for learning a subject.
4. Appropriate methods of learning are available.

In any situation involving an instructional problem the instructor should be prompted to ask two questions. The first of these relates to the reason it is important for the trainee to learn the instruction; and the second relates to the consequences if such instruction is not learned.

In responding, the instructor must analyse why it is important to spend time and effort instructing - no small task - and whether - will it ensure that the final result is really worth the effort? For an answer to the second part, the instructor must demonstrate to the learner that it is worth the effort to learn. After all, isn't the learner's time valuable. It therefore becomes important to justify the time spent on the learning and the consequences if the learner does not gain the knowledge presented.

They are Interested in Learning

The basic desire to learn exists in us all. However, it will vary from learner to learner. The basic interest in a particular vocation may more likely be promoted by parental influence, counselling or family background. In some cases the initial

interest in learning may be promoted through competition, self preservation, curiosity, pride, or even to gain promotion. Nevertheless, some *prime motivator* must exist; the instructor would be wise to become acquainted with a trainee's reasons for learning.

The Incentive to Learn

The basic desire or interest in learning is 'short term', and does not always maintain the full impetus to the learning process. A good instructor will always provide incentives to learn. The following frequently stimulate and maintain interest:

1. Encouragement and merited praise.
2. Pride in one's achievements.
3. Successful achievements.
4. Team building with delegated responsibilities.

A Reason for Learning

One of the most important, yet neglected, elements of the learning process, is *interesting* the learner in what is about to be learned. In other words showing the learner how this new information can be related to the "overall picture". Many job instructors completely ignore, or underrate the importance of, motivation and orientation in the learning process. These instructors will soon hear complaints of, "irrelevant", "why do I need this stuff?", "boring", etc.

Much research has been carried out in this area, and results indicate that people learn with greater efficiency and effectiveness if they are told WHAT they are required to learn and WHY the need to learn it.

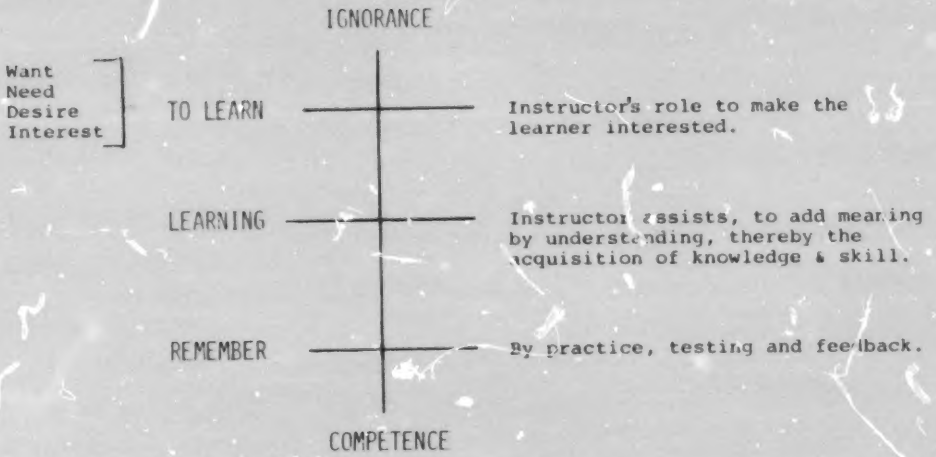
The Sequence of Learning

To master a subject or acquire a new skill, trainees will normally depend upon three basic personality characteristics.

1. The initial motivation - effort an individual is prepared to expand - to overcome their ignorance.
2. Their ability to learn, understand, and remember.
3. The ability to apply newly acquired knowledge and skills over an ongoing period.

Summary

These fundamentals discussed in this section can be related in the following sequence of learning:



Your job as an instructor is to lead the learners through these stages until proficiency is reached, at which point the trainees are competent to perform the job on their own.

3 THE MECHANICS OF LEARNING

Introduction

In setting out to highlight some important point that the job instructor should know about the learner, one should warn of the fallacy of the "average trainee". Nevertheless, in the interest of ease of presentation, we will assume that most people behave and respond in an average manner while under training. However, be aware, from material already discussed, that people differ widely when cast in the role of "the learner".

Ways of Learning

It has been established that all learning is through one or more of the five natural senses. Research has shown that the senses contribute to a learner's ability to absorb new information in approximately the following ratio:

through	SIGHT	78%
through	SOUND	12%
through	TOUCH	6%
through	SMELL	3%
and, through	TASTE	1%

These five senses are shown in a diagram on page 12. Quite often they are referred to by more technical names, and these are shown on the diagram for interest only.

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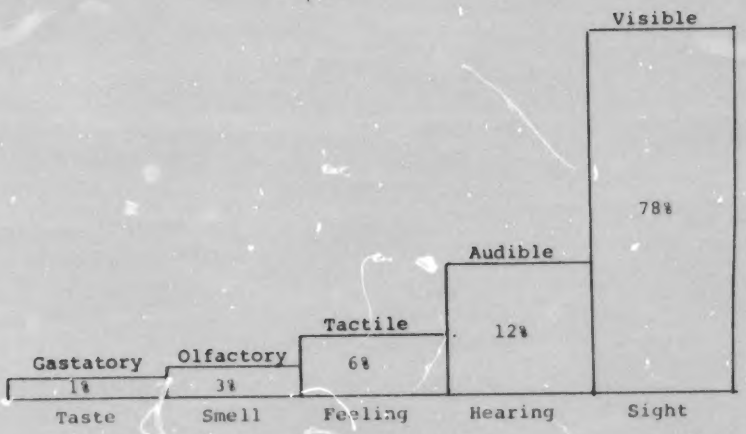


At first glance it might appear that Audio Visual training techniques alone are likely to produce the training results required. However, this is far from the truth. To illustrate that the subject is somewhat more complex, one must consider the ability of the learner to retain new information gained by use of the various senses.

As a general guide we retain information at approximately the following ratios:

SIGHT	-	10% of what we read.
SIGHT	-	30% of what we see.
SOUND	-	20% of what we hear
SIGHT/SOUND	-	50% of what we see and hear.
TOUCH/SIGHT/SOUND	-	80% of what we feel, see and hear.

These percentages are of illustrative importance only, but nevertheless, it reveals that good training should comprise as many of the appealing senses as possible. The emphasis should be on Sight, Sound and Touch.

THE MEMORY

The ability of an individual to recall knowledge information is termed Memory. There are two kinds of memory which interest the job-trainer:

1. Rote Memory. From which information of habit is drawn. Knowledge is usually gained from retention where thought and analysis is not required (eg. multiplication tables).
2. Pure Memory. From which the logical processing of information produces thoughts, ideas or even new forms of the original information.

RETENTION

Retention is a time based phenomenon and decreases with time. If new knowledge and skill is not applied it is soon partially forgotten. People tend to remember the most recently received material, rather than dated information. However, the degree of stimulation associated with the learning experience plays a great part in retention (often with negative results). Repeated examples tend to be committed to memory rather than single cases.

Relearning

Material once learned is seldom completely forgotten, such material is usually relearned in a much shorter time than the original experience.

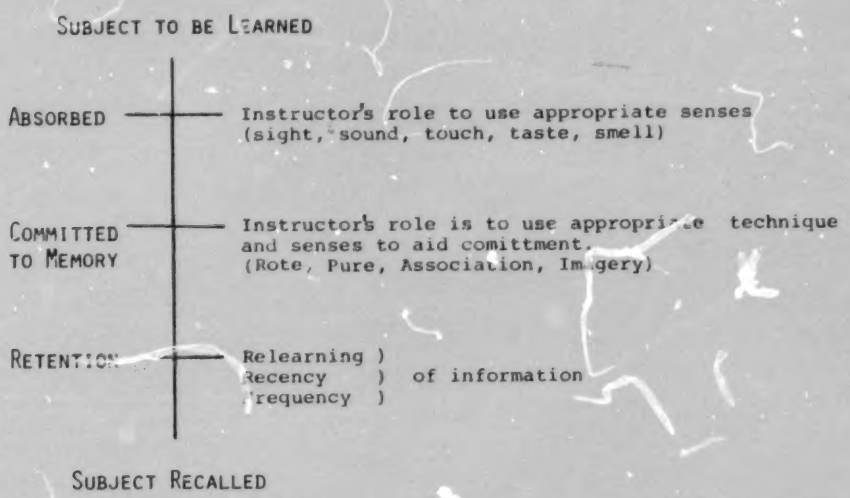
Associations

Often a complex idea can be remembered because of a deliberate attempt to associate it with an easily remembered formulae. These are memory joggers, the most common of which are mnemonics. For example, most school pupils will remember "Richard of York Gained Battles in Vain", when thinking of the colours of the rainbow on their physics experiments on sunlight.

Imagery

This is simply the mental picture conjured up on stimulation from one or more sense. For example smells of cooking, frequently prompt us to imagine the appropriate dish.

Summary: "The Mechanics"


Subject to be Learned
Absorbed
Instructor's role to use appropriate senses (sight, sound, touch, taste, smell)
Committed to Memory
Instructor's role is to use appropriate technique and senses to aid comittment. (Rote, Pure, Association, Imagery)
Retention
Relearning)
Recency) of information
Frequency)
Subject Recalled

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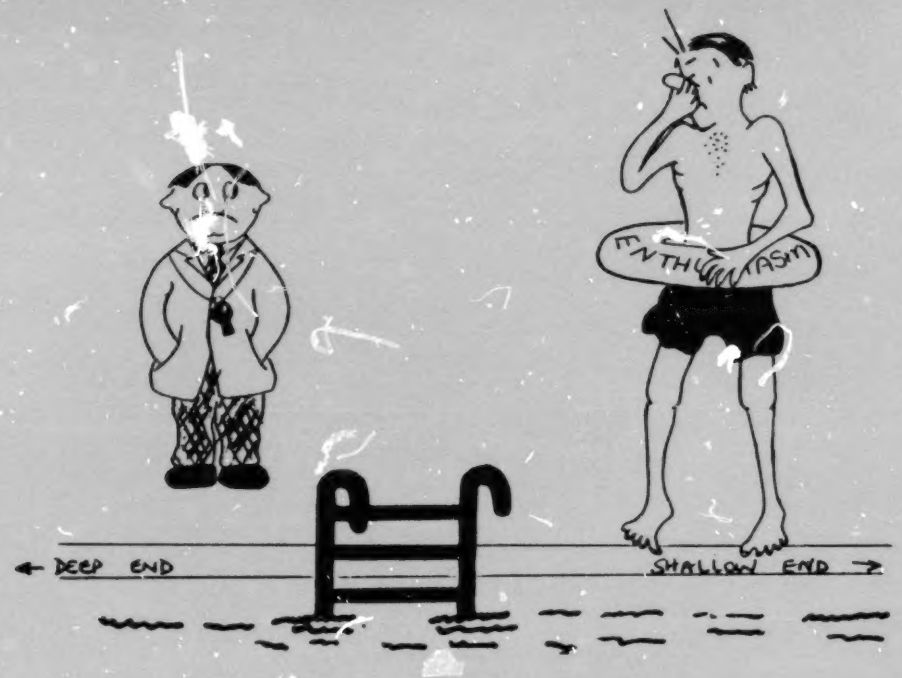


4 THE LEARNER

Introduction

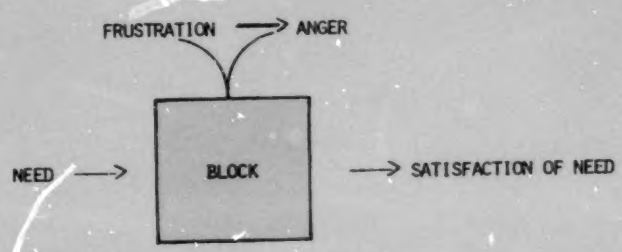
Trainees are people who have needs, drives and desires that must be satisfied. If the learner is frustrated the learning process is interfered with. All instructors have a responsibility to minimize these frustrations, and to do this they must learn to consciously observe and recognize behaviour patterns. The learner is hardly likely to tell the instructor "I feel inadequate", yet failure to recognize the symptoms of frustration will certainly lead to low levels of learning.

Understanding Frustration

You have undoubtedly observed a youngster throwing a temper tantrum and may have expressed something to the effect that:

"It looks like they didn't get their own way!"

In like manner whenever trainees are frustrated, they experience varying degrees of anger and resentment. But as we grow older, most of us have learned that temper tantrums aren't acceptable adult behaviour. The anger is still felt, but the expression of it has become more complex. *A basic model you can use in your learner's case is the following:*



As you think about this model as it applies to on-the-job training, you should identify some of the needs which your trainees are trying to satisfy. Certainly most

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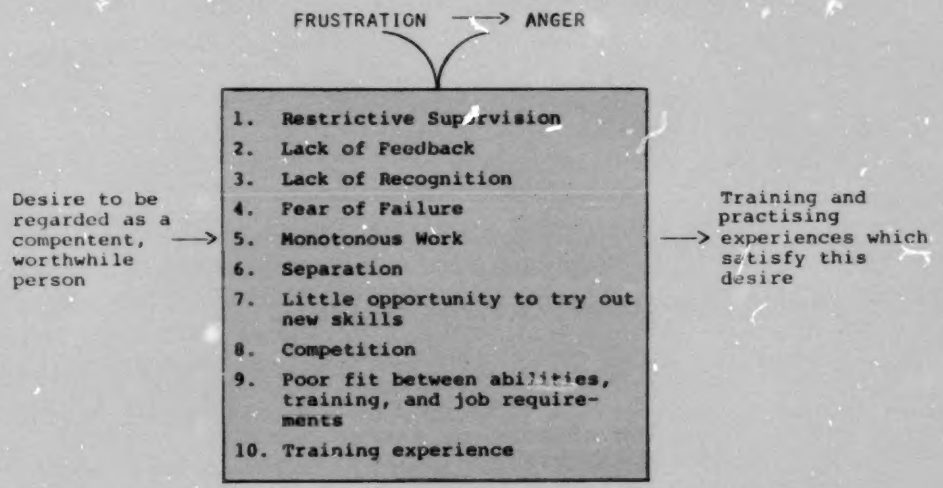
folk are in the work place first of all to earn the money which enables them to satisfy many needs away from the job. However, while at work there is also usually a desire to be an accepted member of a congenial group of work associates. And related to this is the desire to be regarded as a *competent, worthwhile person.* Let's take another look at the model in this case detailing the variables associated with on-the-job training.


FRUSTRATION → ANGER
1. Restrictive Supervision
2. Lack of Feedback
3. Lack of Recognition
4. Fear of Failure
5. Monotonous Work
6. Separation
7. Little opportunity to try out new skills
8. Competition
9. Poor fit between abilities, training, and job requirements
10. Training experience
Desire to be regarded as a compentent, worthwhile person
Training and practising experiences which satisfy this desire

All of us are caught in situations from time to time where the above need is frustrated and you will probably see a little of yourself in the discussion which follows. Depending upon the strength of the need and the duration and stubbornness of the blocking conditions, the feelings of frustration become greater and the expression of the anger more intense and nonconstructive.

BLOCKS AND DEFENCE MECHANISMS

The following things are likely to cause worry, frustrate and anger the trainee, to a greater or lesser extent:

1. Restrictive supervision.
2. Lack of recognition.
3. Fear of failure.
4. Feeling of inadequacy - both personally, socially and intellectually.
5. Separation from family, friends.
6. Unfamiliar surroundings.
7. Unfamiliar classmates/workmates.
8. The air of competition.
9. The aura of instruction ("back to school").
10. Lack of feedback.

The effect of all of these things will be to put the trainee on the defensive in any one of the following ways:

1. Socially - brashness/aggressiveness ("Life and soul of the party")
   - withdrawal ("It must be me")
2. Intellectually - Studiousness
   - "couldn't care less"
3. Work-wise - blind acceptance of new ideas
   - determined clinging to old ways
   - direct ("take that")
   - overcompliance ("If that's what you want")

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We call all of these subterfuges "defense mechanisms" and their purpose is to, consciously or unconsciously, hide from others the fact that we in some way feel inadequate, frustrated or angry.

Once the trainees have been in the learning environment for some time, they will, if the instructor has done the job properly, feel more "at home", and will normally learn without interruption. However, at times during instruction, the trainee will again raise these defence mechanisms, probably at a difficult or disheartening phase of the training, in any of the following ways:

1. Will *rationalise* - substitute a plausible reason for the real one. For example, when trainees fail a task, they are more likely to blame the quality of the test given than the inadequacy of their own ability.
2. Will resort to *escapism* when the going gets difficult. This can be mental (daydreaming) or physical escapism (malingering).
3. Often the learner displays *aggressiveness* - frustration; either openly, or by sullen movements.
4. The learner will give up in *resignation*, at the extreme point of frustration, and will lose all interest in the subject.

The *instructor's responsibility*, in this respect is to minimize trainee frustrations. This can be done in a number of ways:

1. By knowing the basic background of the trainees before they commence training.
2. By presentation of material:
   - sequentially arranged, so as to not "leave anyone in the dark".
   - interestingly presented, to arouse motivation, and feelings of relevance.
   - employing a variety of teaching methods.
   - practical/discussion groups/instruction sheets/individual instruction etc.
3. By personal manner:
   - being approachable, so that trainees know they can present you with their learning problems.
   - being knowledgeable in your trade area, so that the trainee feels confident in the worth of your instruction.
   - knowing the trainees by name, as individuals.
   - giving positive recognition where it is due, for tasks well done, and not just highlighting unsatisfactory things.
   - admitting personal mistakes - no one can be right all of the time.
   - taking trainees into your confidence - at least to the extent of letting them know what is expected of them, and keeping them informed of their progress.
4. By arrangement of the learning environment:
   - heating/lighting levels
   - equipment layout
   - live examples where possible.

It is a sign of a good instructor that the trainee is "with it", successful, and enjoying learning. Trainees are complex beings who amply repay a little understanding of them by the instructor. An awareness of the trainees, their needs, drives and desires, will greatly help you to succeed as an instructor.

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SOME PROBLEMS FACING THE LEARNER

The Effect of Age on the Learning Process

Since training has to cater for the needs of people in age groups ranging from the school leaver to those approaching retirement, it is essential to consider the training problems posed by the effect of age, and its bearing upon outlook, experience, past environment and motivation.

It is not suggested that one should go as far as categorising all age groups. This is unnecessary and distasteful, but certainly the successful instructor will be aware of age problems that influence training.

An appreciation of the two extremes should give an insight into the effects of age upon the learning process.

School Leavers

Trainees in this category are in a period of transition from one environment to another. This transition poses many problems affecting the successful completion of their training. Briefly these are:

1. Loss of individual importance. The senior school leaver is now the junior apprentice - feels to be a little fish in a large pool.
2. Imposition of more difficult conditions. Hours lengthened by one-third. Expected to live up to 'tough school'.
3. Change of environment. More dirt, noise, danger and less opportunity to 'play' to alleviate boredom. The latter caused thoughts of outside interests to be a welcome diversion from the dull routine and the necessity to concentrate.

THESE PROBLEMS STRESS THE NECESSITY TO ABSORB TRAINEES INTO A TRAINING PROCESS THAT IS INTERESTING AND SATISFYING.

Mature Trainees

In this group the problems are less but may still include:

1. Those due to change of environment - change of employment hours and conditions etc.
2. Those due to increasing personal responsibilities, for example, doubts about meeting targets expected from them. They are also more conscious of what other members of the work force think of them and their ability.
3. Those due to having been away from normal training processes for a long time - a feeling of rustiness - a slowing down of the ability to learn - fears created as a result of failure experienced in earlier years.
4. Those due to moving from purely operative skills to new tasks involving mental skills of analysis and synthesis.

Mature Learners: Some misconception dispelled

Recent research both in the United States and the United Kingdom has indicated:

1. The average mature trainees are at least intellectually able, and perform as well, as their younger peers. You <u>can</u> "teach an old dog new tricks".
2. Adults who continue to participate in learning, learn more effectively than those who do not. Learning skills need practice to be maintained.
3. Adults learn best at their own pace. People learn at different rates, this factor becoming more pronounced with age.

THESE PROBLEMS SUGGEST A PRECISE STUDY OF EACH INDIVIDUAL, THE SELECTION OF THE BEST METHODS OF TRAINING; PERHAPS MORE FREQUENT BUT SMALLER 'DOSES' OF INSTRUCTION. LESS VERBAL LEARNING, RATE OF LEARNING, CONFIDENCE BUILDING, ABOVE ALL, PATIENT PERSEVERANCE IN ACHIEVING YOUR OBJECTIVE.

Problems Common to Both Age Groups

People in both groups are subject to learning difficulties created by:

1. *Fatigue.* This may be mental or physical. The instructor should always be conscious of the correct balance between theory and practice. Practice makes perfect providing fatigue is not present, otherwise the quality of performance will deteriorate.
2. *Being a passive participant.* Passive, inert learning environments create learning difficulties. Learning is an active process demanding action and involvement not boredom.
3. *Being rushed.* Time must be provided to practise the learning, to consolidate and gain confidence.
4. *Failure to recognize there are different levels of learning.* Learning to memorize a simple procedure for rote recall, is quite different from learning a major plan. There are at least four levels of learning, each demanding its own method, timing and measures.

PROBLEMS ARISING FROM CULTURAL DIFFERENCES

This handbook can deal only briefly with cultural factors that can affect job-training.[1] This section is directed primarily at those job-instructors who are responsible for the design and implementation of training for trainees from other cultures.

The following are some of the major differing cultural factors to consider when job training in a multi-cultural environment:

1. Learning habits.
2. Vocabulary, language and terminology.
3. Labour laws and regulations.
4. Human behaviour and attitudes.
5. Previous training and education.

The job trainer should be aware of the characteristics of different cultures, for in every nation there are strongly held beliefs, traits and behaviour patterns. Some of these to be aware of are:

1. Language and communication.
2. Dress and appearance.
3. Food - feeding habits.
4. Time and time consciousness.
5. Rewards, recognitions and gratuities.
6. Relationships - family and hierarchical.
7. Values and standards.

In a multi cultural environment, a well designed and presented job-training package can serve two functions; first, it can develop an effective workforce, and secondly, it can help to establish a favourable work environment within the

1. *Further details covering a wide range of cultures can be obtained from any VTC Regional Liaison Officer.*

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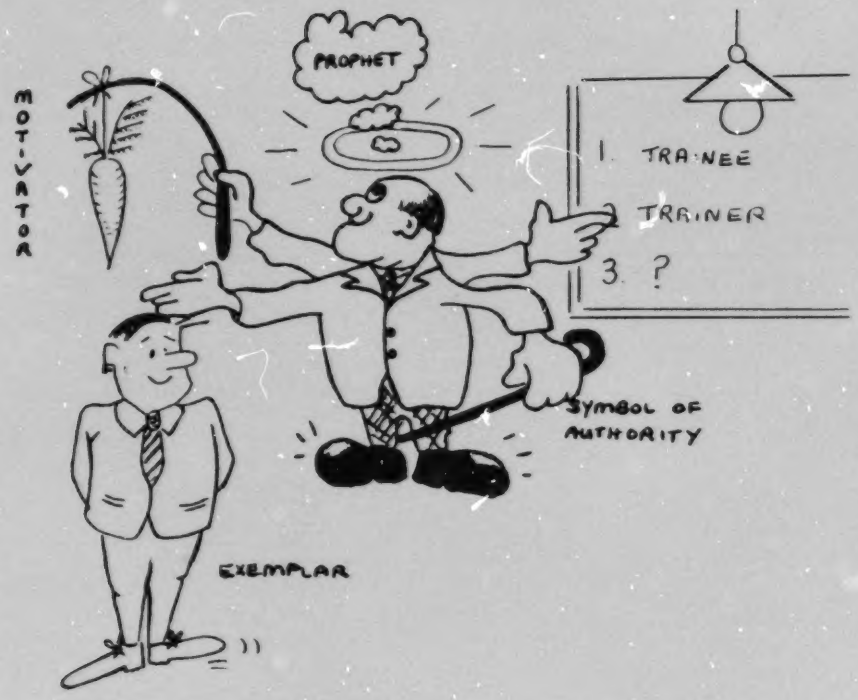
organisation.

5 THE JOB INSTRUCTOR



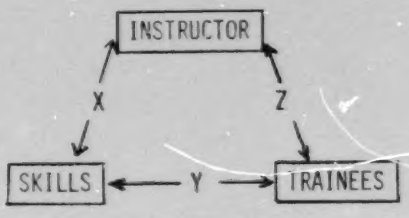
INTRODUCTION

Instruction is so integrated in the relations between an instructor and the trainee(s), that unless this is clearly understood the most competent of trades-people will fail in their instructional task.

In the instructing/learning setting, there are three main interrelated factors:

1. Skills to be learned.
2. Trainees to learn them.
3. An instructor who possesses these skills, and whose job is to teach them to the trainees.

These can be presented diagrammatically as follows:



Where X = Trade-skills
Y = Trainee-attitudes/instructor instructional skills
Z = Instructor-trainee relationships.

The presence of Factor 'X' is taken for granted. Factor 'Y' is dealt with elsewhere in this handbook; trainee-attitude in, and instructional skills throughout the book. The aim of this section is to examine the instructor-trainee relationship from the point of view of the personality and attitude of the instructor.

An Ideal Instructor?

There are probably as many kinds of instructor-personalities as there are instructors. Is one of them the 'ideal'? The answer is probably no. Certainly there are 'good' and 'bad' instructors, as any trainee will tell you. What is the difference?

The 'good' instructor

One Major Factor

The personality of the 'good' instructor tends to be marked by one major factor; *They recognise the trainee as a person and relate to them as such.* (The 'good' instructor would, for example, be well aware of the difficulties experienced by trainees of all ages.)

Attitude to Trainee

To the 'good' instructor, training is a heartfelt vocation, and not just a chore. In accepting the role of trainer, he also accepts the many other roles in addition to that of being an instructor:

Orator	Therapist	Pscho-analyst
Guide	Designer	Exemplar
Seer	Leader	Father-confessor
Interpreter	Manager	Symbol of authority
Tutor	Prophet	

Personal Qualities

To achieve these roles, and to continue to function as an individual, the instructor needs a formidable list of personal qualities, including the following:

Patience	Encouragement	Self-Discipline
Understanding	Trustworthiness	Neatness
Tact	Responsibility	Approachability
Humour	Confidence	Impartiality
Enthusiasm	Authority	Consistence
Cheerfulness	Empathy	

A formidable list indeed. As one potential instructor put it, it describes a saint, not an instructor! Clearly, there are very few people who consistently exhibit all these qualities. The 'good' instructor, however, is the one who tends to exhibit the right combination of these qualities, in the right proportion, at the right time.

Obviously, the 'bad' instructor will be the complete opposite of the 'good'. Namely:

Impatient	Sloppy	Morose
Sarcastic	Arrogant	
Overbearing	Autocratic	

However, the instructor could also be regarded as bad' because of an over-abundance of the 'good' qualities. For example; could be over-confident, excessively full of humour, painstakingly tactful or over-solicitous about the trainees welfare. Again, the trick lies in striking a balance.

The successful instructor

The successful instructor possesses, therefore, many qualities of a leader. These are too numerous to list here, but some of those important to the job of instructing, require that you:

1. Treat the trainee as an individual.
2. Be firm but sympathetic and tolerant.
3. Always let it be known you are approachable.
4. Never be sarcastic or bullying.
5. Never bluff - always admit a lack of knowledge.
6. Encourage through praise, when merited.
7. Be confident but natural.
8. Set a good example.
9. No favouritism. Never let it be seen that you have favourite trainees.
10. Be honest. Trainees trust your integrity, they believe you practise what you preach.

YOUR GUIDE IS:

SET AN EXAMPLE

BE (FAIR, FIRM, FRIENDLY)

SEE THROUGH THE EYES OF THE TRAINEE.

Conclusion

While not all personality-types make 'good' instructors, most can. Those instructors who maintain a sense of proportion in their relationships with their trainees, are keen for their trainees to do well, and lead them towards their objectives by sound instructional techniques, tend to be regarded as 'good' instructors.

SOME INSTRUCTORS ARE 'BORN', MOST ARE 'MADE'

PART 2

COMMUNICATIONS, MOTIVATION AND HUMAN RELATIONS

ELEMENTS PRESENT IN THE JOB-INSTRUCTION SETTING

COMMUNICATIONS, MOTIVATION AND HUMAN RELATIONS

we are here

TEN PRINCIPLES OF GOOD JOB-INSTRUCTION

INSTRUCTIONAL METHODS

AIDS TO THE JOB-INSTRUCTION

TACKLING THE JOB-INSTRUCTION

CONFIRMING, RECORDING AND ADMINISTERING THE JOB TRAINING

1 Communications: An instructor's tool of trade

2 Motivation and Human Relations

[1] COMMUNICATIONS: AN INSTRUCTOR'S TOOL OF THE TRADE

INTRODUCTION

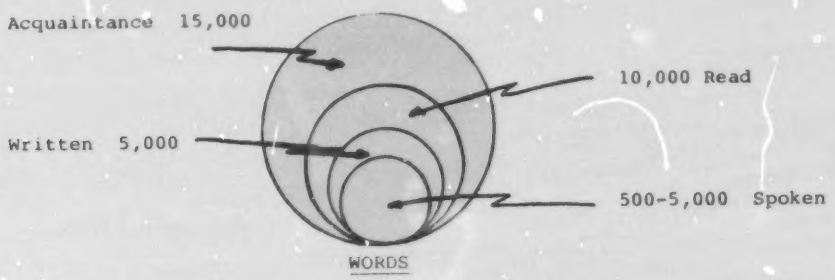
Without bothering about a very scientific definition of COMMUNICATIONS, we all can easily agree on the fact that:

> Communications is a process of passing and receiving information from one person to another, to create understanding and provide a bridge of meaning between people - (Sender and Receiver).

In spite of this being very simple, this is often forgotten, or neglected in practice, by the job instructor. The training-learning process, discussed in part 1, is more than just the transmission of words from Instructor to trainee. Nevertheless, good training requires the use of PROPER WORDS that will convey useful information. The trainees, in turn, must ACTIVELY LISTEN rather than simply hear the words. In the main this means they must interpret and deduce meaning, and relate words to the training being undertaken.

WORDS

There are over 600,000 words in the English Language, but, however, most of us get by quite adequately using a very small proportion of these. Typically our total vocabulary may look something like this:



Nevertheless, our problems stem from the area of least useage, words that are *written or spoken*. Some take the view that it pays to enrich your word power - increasing your vocabulary - this is of little practical use if your listener or reader fails to understand the meaning of the new words! We do most of our communicating by arranging informative words in a sequence and transmitting them. These words are received and decoded into the former transmitted information. However, one should not forget that all the senses discussed earlier, can be used for, or contribute to, successful communication.

THE COMMUNICATIONS PROCESS

What we have in fact described is the *communications process* which we can represent pictorially as a simple loop circuit.

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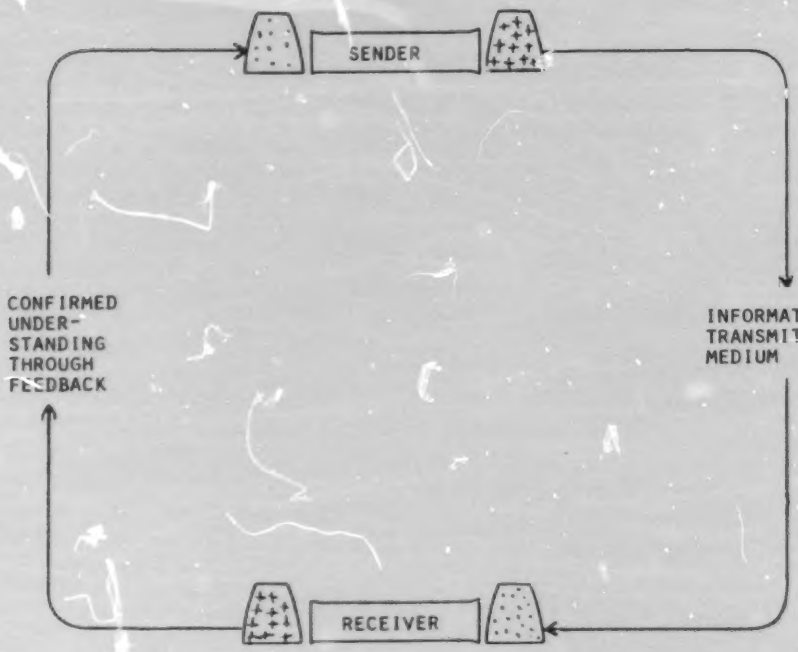
THE COMMUNICATION CIRCUIT



OR

WRITER / SPEAKER / ACTOR — SENDER ——— SIGNAL ——— RECEIVER — READER / LISTENER / REACTOR

Encoded Information

Decoded Information

THE PURPOSE OF COMMUNICATIONS

It should always be kept in mind that the purpose of giving instructions is to get things done. It is also important to remember that it is highly desirable to get these things done with a minimum of irritation and frustration on the part of the receiver of the instructions. Factors that detract from the quality of the information, at any point in the circuit, reduces the chance of successful communication. They are generally referred to as *barriers* to communication.

COMMON BARRIERS TO INSTRUCTIONAL COMMUNICATIONS

In general these may be regarded as obstructions that cause things to go wrong. Many training sessions have been spoiled, production lost, time lost, and material wasted, due to poor, or lack of, communication. Some of the barriers to communication are listed as follows:

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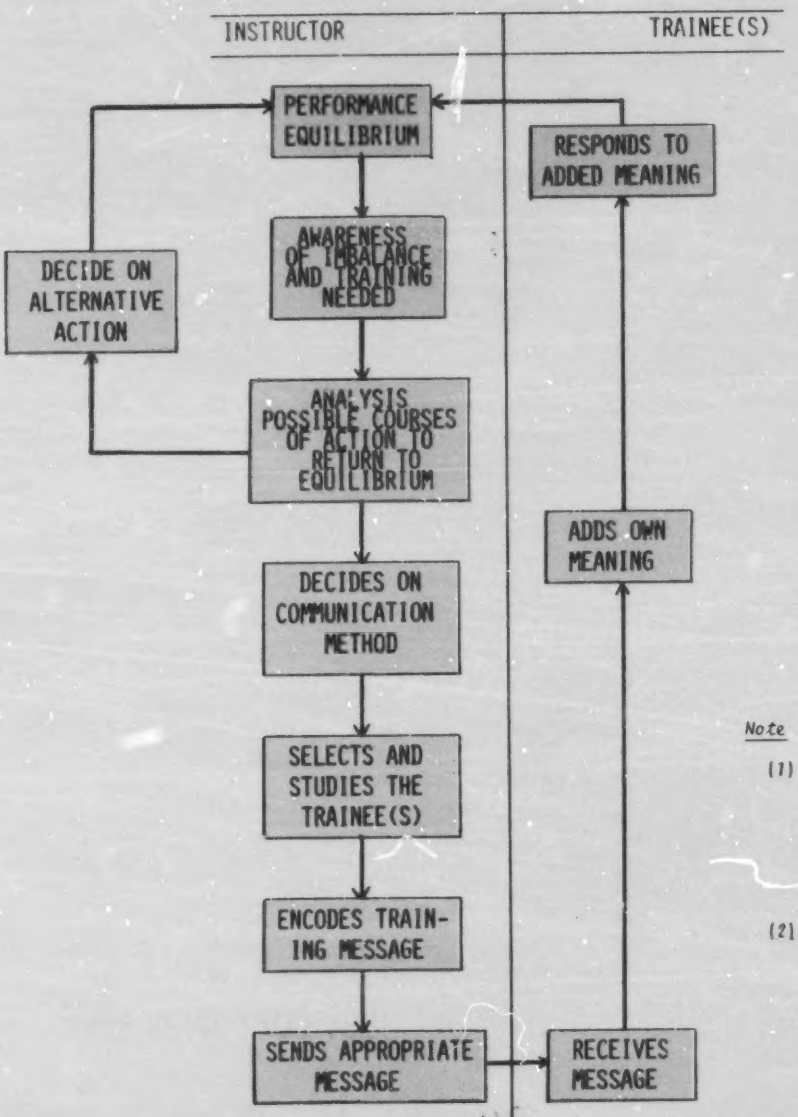
1. Conflicting instructions, failure to understand.
2. Use of incorrect words, jargon, misspelled, unfamiliar and clichés.
3. Language problems, double meanings.
4. Differing perceptions - seeing things differently.
5. Instructor knows too much.
6. Assuming the trainees know where they are going.
7. Illogical presentation.
8. Not on the same wave length.
9. Restrictive questioning.
10. Emotive words.
11. Tortured prose.
12. Not listening actively - listening and hearing are two different things.

Many more barriers will spring to mind, but it is interesting to identify those factors in the communication process that come under the control of the instructor. If these components are controlled by the competent instructor, chances of unsuccessful training communication is reduced considerably. The following diagram illustrates this instructor-trainee communication relationship.

INSTRUCTOR-TRAINEE COMMUNICATION RELATIONSHIP



Note

(1) *The term Performance Equilibrium refers to a state of balance between the skills needed to do a job and the skills actually possessed by the trainee.*

(2) *Based on a model 'Process of Communication' (from Thomas E. Anastasi, Jr., A Secretary is a Manager, Devlin House, Medfield, Mass 1976).*

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"If the Instructor controlled components of the model function correctly the chances are the trainee will respond to return to equilibrium!"

> **Ponder:** I know you believe you understand what you think I said. But I am not sure you realise that what you heard is not what I meant.

IMPROVING COMMUNICATIONS

When giving instructions it is essential for instructors to:

1. *Consider their approach to the individuals* in terms of ability, attitude and experience.
2. *State clearly what has to be done* - this should also be done (if spoken) in a confident manner and not in a way that would set up a resistance on the part of the instruction receiver.
3. *Make it brief and to the point* - don't waste words and time.
4. *Emphasize the importance of the job* - and so motivate the receivers of the instructions to carry out the job to the best of their abilities.
5. *Check on feed-back* - and see that the instruction has been understood by the receivers and that they have sufficient knowledge and confidence to carry out the job.
6. *Listening actively not passively*
   1. You must be able to *listen attentively*, patiently
   2. You must avoid unnecessary distractions in the training area.
7. *Speak clearly* - if the instruction is given vocally, face the person to whom you are speaking so that you can hear and notice any response to the instructions.

NOTE: 1. THINK CLEARLY - ARRANGE LOGICALLY - EXPRESS CLEARLY - USE APPROPRIATE LANGUAGE AND EXPRESS CONCISELY.

2. HAVE YOU GOT SOMETHING TO SAY? IS IT WORTH SAYING?

2 MOTIVATION AND HUMAN RELATIONS

INTRODUCTION

To be recognised as a motivated individual, a person must have an obvious goal. The term is often misused, particularly in the context of "going to motivate someone". 'A Motive' is that which psychologically moves a person to respond. External motives can not exist. This is a very important concept which must be grasped by the job-instructor who must differentiate between stimulation and motivation.

We know from experience a person is motivated to achieve if they are involved in the goal setting process. It therefore follows, that the more instructors understand of human nature and relations, the better they will be able to assess a trainee's motives and possible stimulants.

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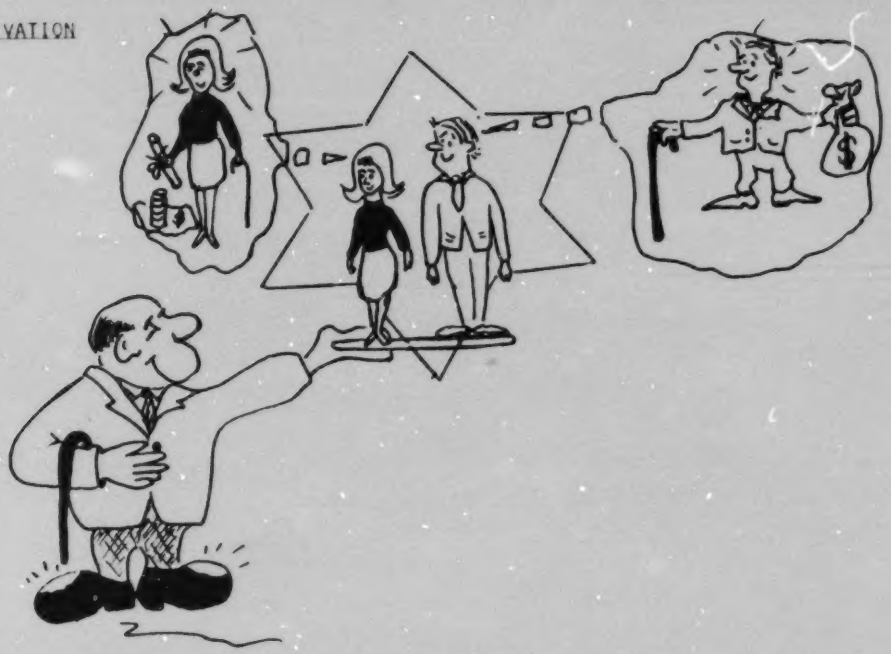
MOTIVATION



Motivation and stimulation has been the subject of research for several years. In the brief treatment of the subject permitted by this manual, theoretical concepts and theories will not be introduced. However, a deeper study of this area is unnecessary for the job instructor at this stage.

KNOWLEDGE OF PEOPLE

Researchers generally agree on the following points that will help the job instructor understand a trainee.

1. As a rule when we set a personal goal, we take into account our values, interests and abilities. Normally personal goals are achievable.
2. A person works harder as the goal becomes nearer (end spurt). Alternatively if we encounter obstacles in the satisfaction of some goal, we may become aggressive.
3. Happiness and satisfaction are increased when the goals are clear. We all like to know where we are heading.
4. All behaviour is directed toward the satisfaction of goals. For example, when you are hungry, you eat in order to relieve the discomfort of hunger. Therefore, we can say that our behaviour tends to satisfy some need that we are experiencing.
5. We generally take the easiest way of satisfying our need. We might call this the principle of least effort. We buy raffle tickets because it represents an easy way of satisfying our financial needs - if we win!
6. We frequently forget that what counts to most people is their point of view. They are not necessarily concerned about the truth, but what feels to be true. This means that in order to change someone's behaviour we must change their attitude towards things as they see them.

REMEMBER

Motivation comes from within an individual, he or she must want to do something. It becomes our job to activate this desire - probably our biggest problem, yet it provides us with the necessary ingredient of motivation - a challenge.

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HUMAN RELATIONS

This is another term often misused in discussions on training and management. All too frequently it is thought of solely in terms of a management science. What is meant by the term 'Human Relations'? Here are four *good* definitions that will help you to form your own view:

1. It is the commonsense handling of people as individuals.
2. It is a golden rule for trainers, treating others as we would like them to treat us.
3. It is the *practice* of diplomacy in our daily relationships.
4. The *art* of letting the other person have our way!

Up to this point we have stated that Human Relations is an *Art* and a *Practice* Furthermore, we have said it is not solely a science.

> **A *Science* is an exact statement of knowledge on a subject.**
> **An *Art* is the ability to apply the knowledge we have.**

Good human relations, then, is *a science*, in that it requires knowledge of human behaviour. It is also *an art*, in that the knowledge must be applied to our particular every-day relationships with people.

> **HUMAN RELATIONS MIGHT BE SIMPLY TERMED APPLIED KNOWLEDGE OF HUMAN BEHAVIOUR.**

BASIC PRINCIPLE OF HUMAN BEHAVIOUR

From our discussion on human relations thus far, we are obviously thinking which of these many facets are of interest to the job-instructor? In the scope of this

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handbook it will be impossible to explore all the principles. Rather, we will concentrate on two concepts that are basic to a knowledge and understanding of people.

CONCEPT 1: People are all different to some degree.

CONCEPT 2: People are all very much alike.

PEOPLE ARE DIFFERENT

One of the first prerequisites of good human relations for the job trainer is to recognise that no two people are alike, or, all their trainees are *different* people.

HOW PEOPLE DIFFER

1. Age
2. Weight
3. Size
4. Looks
5. Sex
6. Marital Status
7. Religion
8. Nationality
9. Intelligence
10. Social Status
11. Hobbies
12. Emotion
13. Aptitudes
14. Skill
15. Temperament
16. Dress
17. Habits
18. Personality
19. Interests
20. Learning Ability

These differences have been listed without any attempt to classify them. Nevertheless they divide into four areas, roughly reflecting how trainees differ as people:

PEOPLE

DIFFERENT:

- MENTAL ABILITIES
- PHYSICAL CHARACTERISTICS
- MANUAL ABILITIES
- PERSONALITY TRAITS

Now, what are the implications of individual differences to the job-instructor? Simply stated the implications are these:

1. The range of differences among trainees is generally quite large. Hence it is normal to expect more from one individual than another doing the same task.
2. Recognition of these differences as a fact, a thing we expect to find, is the beginning of successful human relationships, as far as trainees are concerned.
3. While training is important, even after training we may still expect these differences in employees of all ages.
4. People not only differ from one another, but within themselves - do not judge an individual on the basis of any one characteristic or trait. One trait does not make the person.
5. Training - practice on simple operations tends to narrow the range of individual differences, complex operations tend to widen differences already present in people.
6. Do not try to label or 'type' people according to any one type or other - honest or dishonest, clever-stupid, keen-lazy, etc.
7. Finally, people are *complex behaving individuals*. There is no short cut to really knowing a person as an individual, which is essential for any sound instructor-trainee relationship.

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PEOPLE ARE ALIKE

Now that we have agreed that people are all different, let's view the subject from another angle. We will now see why people can still be very much alike. People are all very much alike, in that we all have common basic wants and needs. The concept of *need* is used differently in different contexts, but a need is basic to all human beings. They are born with needs. On the other hand, a *want* is a learning experience in that an individual's desire to achieve something is a function or result of experience.

HOW PEOPLE ARE ALIKE
(Basic Wants and Needs)

1.	Food	11.	Affection	21.	Good health
2.	Clothing	12.	Security	22.	Something to hope for.
3.	Shelter	13.	Success	23.	Friends
4.	Luxuries	14.	Appreciation	24.	Self-importance
5.	Money	15.	Being wanted	25.	Being a part of what's going on.
6.	Prestige	16.	Belonging to the group	26.	Knowing what's going on.
7.	Recognition	17.	Opportunity	27.	A goal to work for.
8.	Work	18.	Being needed		
9.	Sex satisfaction	19.	Freedom		
10.	Love	20.	Fair play		

Again the wants and needs have to be listed without attempting to classify them. As in the case of individual differences, they can be broken down into two main areas, which in turn can be further divided.

First, we can break a trainee's needs and wants into these main areas:

1. Physical - those needs which are essential to satisfying the basic life sustaining needs.

   "God himself dare not appear to a hungry man except in the form of bread."

   GANDHI

2. Social - those needs which meet our natural social demands.

PEOPLE

DIFFERENT:

- MENTAL ABILITIES
- PHYSICAL CAPACITIES
- MUSCULAR & MANUAL SKILLS
- PERSONALITY TRAITS

ALIKE:

(BASIC WANTS AND NEEDS)

- PHYSICAL
  - BIOLOGICAL
  - ACQUIRED
- SOCIAL
  - TO BELONG
  - TO BE IN THE KNOW
  - TO SHARE
  - TO ACCOMPLISH
  - TO BE IMPORTANT
  - TO SAVE FACE
  - TO BE SECURE

Again, the implications of basic wants and needs to the job instructor, must be stated. In the main these implications are:

1. For too many years the tendency has been for employers and 'their' trainers to evaluate a trainee's needs in physical terms only, "we pay the best rates" etc.

2. A trainee's social needs are also impelling, and sometimes more so, than the physical need, and that satisfaction of these needs are powerful motives in the training environment.

3. Trainees are best motivated when the inducements are their own specific individual needs and wants.

It follows then that the job instructor should know enough of human behaviour and the individual to be able to assess the economic, social and psychological wants of a trainee. To do this we will need to cultivate the human qualities of sympathy, friendship and understanding.

PART 3

TEN PRINCIPLES OF GOOD JOB–INSTRUCTION

ELEMENTS PRESENT IN THE JOB-INSTRUCTION SETTING

COMMUNICATIONS, MOTIVATION AND HUMAN RELATIONS

TEN PRINCIPLES OF GOOD JOB-INSTRUCTION

INSTRUCTIONAL METHODS

AIDS TO THE JOB-INSTRUCTION

TACKLING THE JOB-INSTRUCTION

CONFIRMING, RECORDING AND ADMINISTERING THE JOB TRAINING

1. A brief introduction to job-instruction
2. Set the aim
3. Plan and prepare
4. Present new information in sequential steps
5. Maintain interest
6. Use the correct senses
7. Create an active environment
8. Keep it simple
9. Confirm at each stage
10. Allow learners to proceed at their own rate

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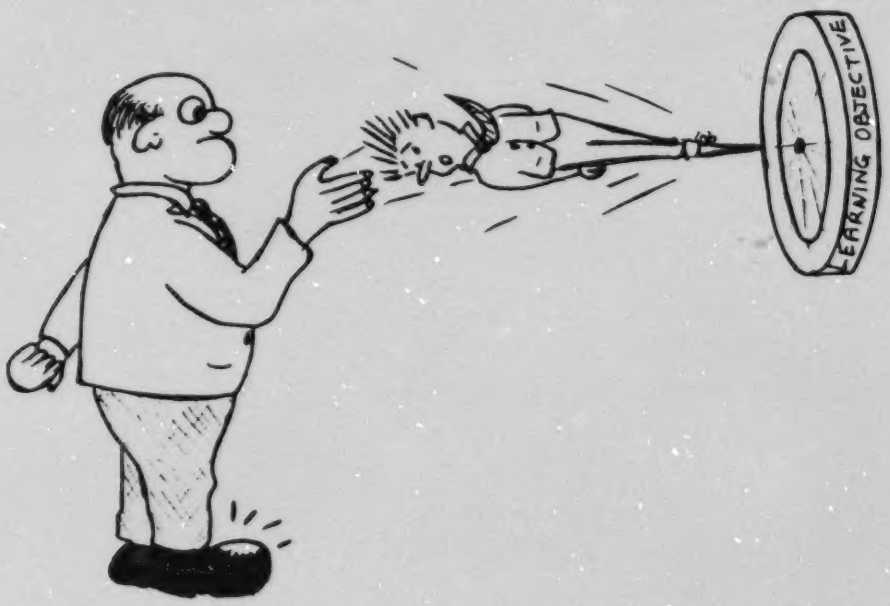
1 A BRIEF INTRODUCTION TO JOB INSTRUCTION

A real need for a sound, systematic method of job training emerged with the massive industrial expansion in America in the 1940's. T.W.I. (Training Within Industry), an advisory service formed by the US National Defence Advisory Commission, did much to enable American industry meet its wartime production targets. The most notable of its earlier achievements was the way it helped industry to train its supervisors. Moreover, a sound springboard had already been provided for T.W.I. by the earlier research of Fredrick Taylor in 1905, and the works of many other international educators and psychologists of the thirties.

However, it was way back in 1917 that Charles R. Allen developed his, now famous, four step instruction method - SHOW, TELL, DO, CHECK. Allen's works formed the basis for developments made by Michael J. Kane in 1941. Later Kane's work was used to produce a standard programme "How to Instruct", its now famous slogan "If the learner hasn't learned, the teacher hasn't taught" is known throughout the world.

The T.W.I. Job Instruction Programme, and the training principles it promotes, can be found in current use throughout the western world. C.R. Allen's four fundamental steps form the basis of Part 4 of this handbook. Moreover, the ten principles of good job-instruction have an application in a wide range of training settings. In this handbook, the principles are presented in a manner that takes account of modern training ideas, in so much as these ideas relate to a systematic approach to training and instructing.

2 SETTING THE AIM



When developing any element of instruction, an instructor must ask, "what is the aim of this session"?. For if the instruction is to be successful, it must have a series of aims or objectives. We have already mentioned the value of writing a statement of the instructional problem, which establishes the training need and the consequences of not satisfying that need. Furthermore, the instructor will have considered the trainee as an individual. Therefore, the aims of the training elements should logically flow from this source.

The learner must consolidate each objective before the next is attempted; the instructor must therefore know precisely what he wants the learner to achieve at each stage. Consider these two statements of the aim of an element of instruction:

No 1. Revision on the NCR 147B Cash Register.

No 2. To wire and test a Type 34 Fuse Box to ERB Regulatory Standard.

Statement (2) is obviously the better as it is clearly defined and has an aim. Before planning any session or element of job-instruction provide the answer to this question:

"What do I want the learner to achieve at the end of the element?"

Your answer should be:

- Clearly expressed using action verbs (action words).
- Be practical
- Be observable

A CLEAR AIM WILL TELL YOU WHAT TO TEACH AND THE LEARNER WHAT TO LEARN

3 PLANNING AND PREPARATION

So many instruction sessions are wasted through a failure on the part of the instructor to plan and prepare adequately. If this stage is neglected, chances are, that what follows will be second rate.

Planning is the first principle of management, and after all, you as an instructor, are *managing* the learning of a new behaviour.

Well-planned instruction and proper preparation of the resources needed help to ensure your instruction is remembered by the trainees. They may also admire the way you presented the subject, and as a useful result, will want to learn more from you.

It is appropriate at this point to mention 'stage fright', the bogy of all new instructors. The degree to which this will affect you will vary, but it can be largely overcome through sound planning and preparation, knowing what you are going to do next, and how.

PLANNING AND PREPARATION HELP THE INSTRUCTOR AS MUCH AS THE LEARNER

4 PRESENT NEW INFORMATION IN SEQUENTIAL STEPS

The fourth principle in the instructional process is to present the learner new information in a logical sequence. Research has shown that often the sequence decided upon by the subject expert (instructor), is not always the best sequence

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for the first time learner. Very often the only way of sorting out this problem is to get feedback from a learner on a trial run. If this sounds a bit "hit and miss" the following common sequencing alternatives may be used:

1. Hierarchical (graded) Information is presented from easy to difficult or simple to complex. Many knowledge subjects lend themselves to this sequence. Moreover, vocationally related skills often lend themselves to this type of sequence. For example, a tyrebuilder would learn the vocabulary, the handtools, the machine operation and then the specific techniques used in tyrebuilding.

2. Chronological (step by step) Such a sequence is often used in machine operations. For example, prepare machine, machine on, loading machine, operating machine, unloading, and turning off.

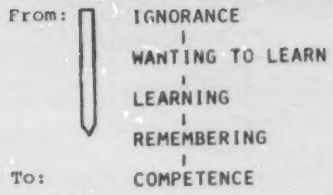
3. Spatial (directional) Where information learned must follow a desirable flow. For example, from left to right, up-down, clockwise etc. This sequencing is applied in medical training, bones are often learned head to toe, where tissue is learned from outside skin layers to the bones and organs.

4. Thematic (by a theme) Where new information is presented according to an obvious theme or relationship. A motor mechanic might learn the car's function by a theme of "car systems": the transmission system, fuel system, hydraulic system, electrical system, etc..

WHICHEVER SEQUENCE IS USED, THE PRESENTATION MUST BE LOGICAL AND DISCERNABLE TO THE LEARNER.

5 MAINTAIN THE TRAINEES INTEREST

We have already decided that a good instructor must exhibit leadership qualities, and to that end must *lead* the trainee through the sequence of learning:



Maintaining interest, particularly with young adult learners, is of prime importance in starting them off at the first stage of a learning sequence, keeping them going during the learning, and confirming their success at stage three.

Whilst much interest will be directly stimulated by the enthusiasm of the instructor, these additional suggestions have a proven track record:

1. Realism In a sales training exercise real products, real money and a real cash register represent the shop setting better than words or imagination. Most instructors appreciate the importance of realism in training. This is why on-the-job training is a preferred method of skill training.

2. Competition Humans are naturally competitive, particularly young people. They will perform arduous tasks put to them in a stimulating competitive way. Getting individuals to better their previous performance is in itself competitive. However, whenever possible use team competitions in preference to individual competition.

3. Variety Boredom is the opposite in effect to stimulation. Repetitive training using exactly the same words will bore your learner to death. Constantly think of subtle changes in your presentation, it will help you and the learner.

4. Curiosity It may have killed the cat, but most people still become interested in investigating something unusual. Capitalize on this human characteristic. Let the learner do some puzzling, this will lead to far better retention than through the receipt of information as straight fact.

5. Incentives We have already discussed a trainee's needs and wants, constantly stressed why the learner should learn, what's in it for them, and recommended (where training permits it) progressively rewarding good performance.

6. Competence Trainees who learn to do a task well feel a sense of pride. If at the same time you, the instructor, demonstrate your satisfaction the feeling of *competence* will motivate them to learn even more. Recognition and competence are probably the most powerful motivating factors in training.

7. Run before you can walk Occasionally give the learners a chance to "run before they can walk", perhaps in the form of a task that is not critical or dangerous. You will have to return to "walking", but the "running" will have stimulated their interest!

CREATE INTEREST TO CREATE LEARNING

6 USE THE CORRECT SENSES

RECAPITULATION

To recap from our former discussion - all learning takes place through one or more of the five senses. These are

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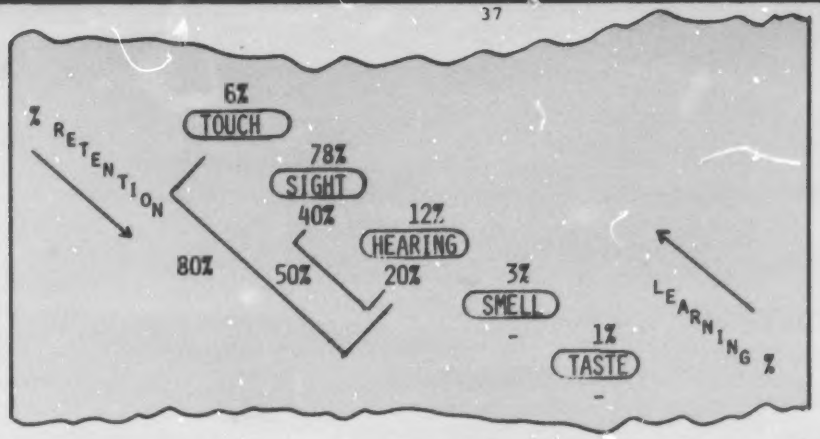
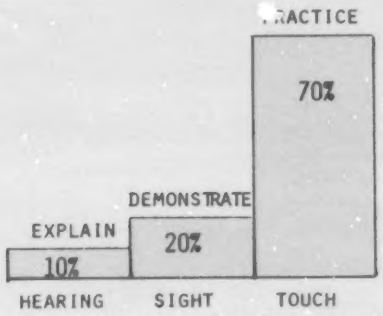


However, we retain information at a different rate.

As a general guide in vocational instruction TOUCH, SIGHT, and HEARING are the major senses. Whenever possible they are best used in combination. Hard and fast rules are not available, nor would they be appropriate, a good instructor must appreciate all are valuable senses in teaching, and deduce which ones are best for a particular job.



Remember this diagram as a good 'rule of thumb'.

SKILL AND KNOWLEDGE

The requirement will be for the learner to learn at least one of the following:

A SKILL - A manual act (motor function) such as threading a needle, torquing a nut, depressing a foot pedal.

A KNOWLEDGE FACT - A mental act (cognitive function) such as understanding theory, explaining reasons for safety, recalling office procedures.

To illustrate this let's take an every-day example where the aim is for a learner to 'master riding a bicycle in accordance with the NZ Ministry of Transport's Road Code'.

SKILLS - Mounting, balancing, pedalling, steering and dismounting.

KNOWLEDGE FACTS - Signals, road code, traffic patterns, signs and directions.

The combination of mastery for both *skills* and *knowledge* enables the learner to practise the technique of cycling and eventually produce the desired performance.

LESS TALK,
MORE SEE,
LOTS OF DO

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ATTITUDES

In addition to the senses contributing to the mastery of skills and knowledge, they also contribute to the attitudes a trainee adopts as a result of the training experience. The training and measurement of attitudinal behaviour is a more difficult procedure than for knowledge and skills. Consequently, it is often the result of subjective assessment, influenced by the bias of the instructor.

Our illustration of 'mastering the skills and knowledge for riding a bicycle', should include some reference to the attitudes a learner should adopt. The illustration should now read:

SKILLS	-	Mounting, balancing, etc.
A KNOWLEDGE FACT	-	Signals, road code, etc.
ATTITUDE	-	Acceptable road conduct, respect for other road users, observe safety precautions.

Definition

An ATTITUDE can be defined as the internal 'posture' an individual adopts towards a person, object or event. This posture affects the individuals choice of action. Attitudes are likely to range from logical to illogical or realistic to unrealistic. They are also *learned* tendencies that are shaped by training.

In virtually all organisations, employees are expected to display certain attitudes such as a sense of duty, pride in their work, loyalty to their employer and care when handling equipment. These attitudes are normally associated with the duties and responsibilities for an employee, and are demonstrated by the way a job is carried out.

Components

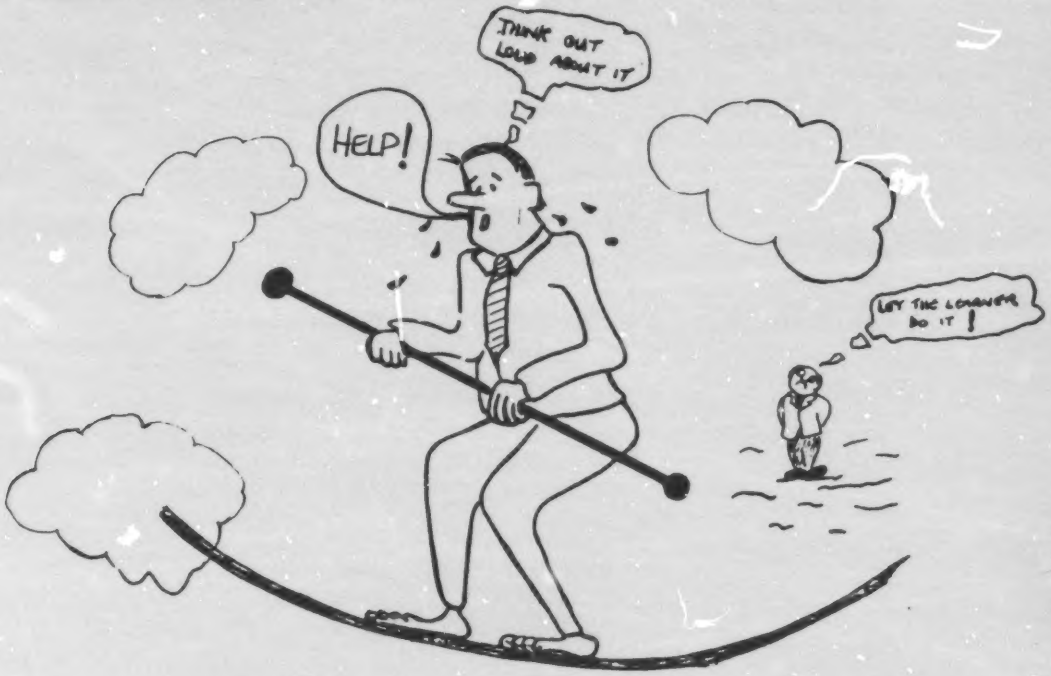
An attitude has three main components. They are as follows:

1. Belief Component. A related set of beliefs or ideas.
2. Feeling Component. An associated set of feelings.
3. Action Component. Affiliated with every attitude is a tendency to behave in a certain way that is consistant with an individual's beliefs and feelings.

For example, factory workers' attitude to correct lifting techniques. The workers might believe because they always lift with a bent back it's not harmful, and they may feel that it's easier not to bend their knees. For these reasons they are likely to lift things incorrectly, until something happens to change their attitude.

This simple example illustrates that there are many problems associated with identifying, changing and measuring attitudes. These problems will be discussed further in Part 6 of the handbook, Tackling The Job-Instruction.

7 CREATING AN ACTIVE TRAINING ENVIRONMENT



An effective training session must do more than orient and motivate the learner and present new information. The information must be processed and a response made. It is vital, therefore, to provide the opportunity for the learner to demonstrate acquisition of the new information. The surest way to learn is by DOING. No explanation or demonstration, however slick, will serve as well as a well supervised practice in which the learner also has to think. Some thought must be given to frequency and difficulty of responses and their relationship to the total aim. Nevertheless, at the earliest chance in every job training session, let the learner "DO IT" and "THINK OUT LOUD ABOUT IT". That is what we mean by an active training environment.

LET THE TRAINEE DO IT
AND
THINK OUT LOUD ABOUT IT

8 KEEP IT SIMPLE

At the beginning of this handbook it was stated that the aim was 'to provide a short, simple, non-academic and practical guide on how to instruct'. A close study of each of these criterion, would reveal that all are non-absolute terms. At this stage, to some readers the book may already appear grossly simple and non-academic, while to others it may have created quite the opposite impression. Simplicity is therefore a difficult principle to adhere to because of individual differences we discussed in part 2. A good instructor must adapt instruction to suit what the learner knows. There are however, some guiding principles. These are:

1. Avoid unnecessary verbal complication. "Elevate your digits to an equivalent altitude" might be readily understood by some. But how many? "Raise your

hand to the same height" is better.

2. Beware of jargon and technical words.
3. Use simple aids to impress vital points, using as many senses as possible.
4. Know your learners, see it through their eyes.

> GOOD INSTRUCTION MAKES DIFFICULT TASKS EASY TO LEARN.
> BAD INSTRUCTION MAKES EASY TASKS DIFFICULT TO LEARN.

9 CONFIRMATION AT EACH STAGE

To ensure the learner has LEARNED, really learned, all job instruction must be confirmed. Only when the instructor knows the learner has mastered the task, can we proceed to the next stage. Instruction must be in logical stages with defined aims. Therefore a performance test must be used to confirm each stage. This way the learner has a chance to digest the training, anu you as the instructor get the correct performance feedback before proceeding.

An instructor should, therefore, be aware of the importance of constructing simple tests to confirm:

SKILLS: By observation in a practical setting.

KNOWLEDGE FACTS: Use: Questions
Problems
Revision Quiz.

> TEST TO CONFIRM THAT YOUR INSTRUCTION HAS BEEN SUCCESSFUL

10 ALLOW THE LEARNERS TO PROCEED AT THEIR OWN RATE

One advantage of on-the-job training is that instruction is usually presented on a small group or an individual basis. This allows for a learner to repeat an element or stage until the particular skill has been acquired. One of the individual differences we highlighted in part 2 was learning ability in different subject matter areas. People have different learning styles and rates, and a presentation that complements all types has yet to be found. The only conclusive evidence in this field shows that if the learner is allowed to proceed through an instructional sequence at their own rate, learning is usually improved. Thus, the critical element here for the job-instructor is to allow sufficient flexibility for the rate of learning to come under the control of the learner, or at least their joint control.

Your instruction sequence should be designed to allow the learner to proceed through it at their own rate. Many instructors boast of fine session/lesson plans that are

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machine-like in their controls, 5 mins - the aim, 15 mins - outline, 10 mins start up, etc. Any job instruction given on such a strict time base may well not be in the best interests of the learner, but may well be highly convenient and satisfying for the instructor.

ELEMENTS PRESENT IN THE JOB-INSTRUCTION SETTING

COMMUNICATIONS, MOTIVATION AND HUMAN RELATIONS

TEN PRINCIPLES OF GOOD JOB-INSTRUCTION

INSTRUCTIONAL METHODS

we are here

AIDS TO THE JOB-INSTRUCTION

TACKLING THE JOB-INSTRUCTION

CONFIRMING, RECORDING AND ADMINISTERING THE JOB TRAINING

PART 4

INSTRUCTIONAL METHODS

1 Which Method?
2 The Theory Lecture Method
3 The Theory Lesson Method
4 The Demonstration
5 The Practical Lesson
6 Individual Instruction
7 The Discussion
8 Programmed Learning
9 Questions and Revision
10 Using your Voice

INTRODUCTION

The most basic concept of job-training is that the instructor possesses skills and knowledge, which must be transferred to the trainee. A general criticism levelled at job instructors is 'that their selection of good instructional methods and techniques could be improved'. This point is particularly pertinent to the part-time instructor, who has a foot in both camps. It is important for the instructor to have experience of a wide range of instructional methods and aids, so that when skills and knowledge are transferred, it takes place in an effective way.

Part 4 of this handbook gives an appreciation of the broad range of methods, techniques and aids, and covers some points about their use.

1 WHICH METHOD?

Bearing in mind that most material to be learned will involve job-related manual skills. The most commonly-used progression will be to: (1) tell the trainee about the topic; (2) then show them; (3) then get them to do it.

OVERVIEW (10%) (1)	DETAILED DESCRIPTION (20%) (2)	PRACTICE & REVIEW (70%) (3)

This can be summarised in the following manner:

THEORY —— TELL

DEMONSTRATION —— SHOW

PRACTICAL —— DO & CHECK

There is no one best method which is applicable to all on-the-job training tasks. The actual choice of method(s) will depend heavily on:

1. What has to be learned - LEARNING OBJECTIVES. If, for example, the trainee is required to have only an understanding of something, then it will not be necessary to progress to the practical stage.
2. Subject matter - simple, complex, verbal, manipulative.
3. Trainees themselves - ability, age, aptitude, experience.
4. Instructor's skills - instructional competence.
5. Available facilities - cost effectiveness.
6. Time - different methods will consume varying amounts of time. Day or night training, am. or pm. training.

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A point about THEORY. This area has to be covered, in some form or other, in most job-training situations. It can be dealt with in two different ways:

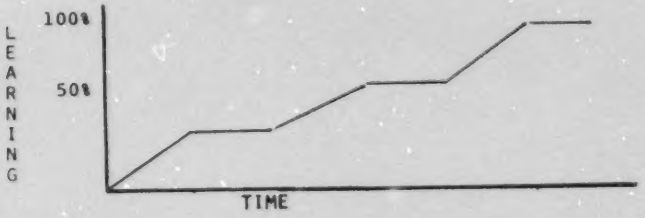
- The telling method - lecture
- The briefing method - lesson (where trainee responses can be taken into account)

So now we have four basic methods that may be used either in isolation or in combination for job-training.

THEORY LECTURE THEORY LESSON	——	TELL
DEMONSTRATION LESSON	——	SHOW
PRACTICAL LESSON	——	DO & CHECK

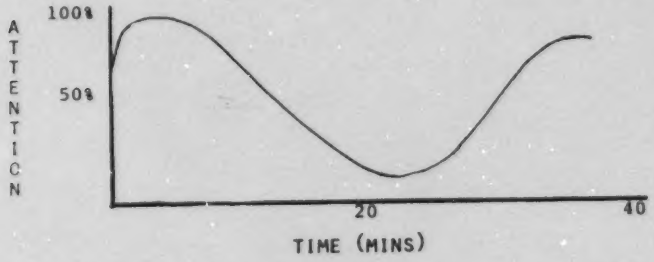
There seems to be no limit to the number of methods available, many of course are products of the electronic and micro-chip age, and many are 'old faces with new names'. The following sections describe methods and combinations thought to be of most use to the job-instructor. No matter what method you employ, the following elements of learning theory will apply:

1. People learn best when they are keen to learn.
2. The material will have to be broken into steps or stages.
3. At each step, the trainees' new knowledge/skill must be reinforced.
4. The mind can only accept so much information at once, or else saturation sets in. We learn on a step or plateau basis so this needs to be catered for by frequent rests, consolidation and revision.



(Overcome steep rises through involvement and feedback.)

5. Unless the trainee is highly motivated, and unless the mind is stimulated by some involvement, the level of concentration will vary. The graph below illustrates how concentration will vary in a typical SHOW-TELL-DO session.



(Keep attention through involvement and feedback.)

6. Some form of *evaluation* is necessary at the end of the step/stage/lesson to check the objective has been reached.

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FORMAT OF A TRAINING SESSION

All instruction should be divided into three distinct parts:

THE BEGINNING
|
THE MIDDLE
|
THE END

This distinction leads to a basic general format for any training session:

- BEGINNING - INTRODUCTION
  - Preliminaries
    - Title
    - Arouse Interest.
    - Keep it short.
    - Need: state relevance of the topic.
    - Range: scope of the session.
    - List objectives.
    - Link: tie up with any previous work.
    - Test: knowledge retained from previous period.
  - Revision
- MIDDLE - DEVELOPMENT
  - Steps
  - Stages
    - Logical flow
    - Key points
    - Variety: Aids & Activity
    - Progress summary
    - Questions & Feedback
    - Conditions
- END - CONCLUSION
  - Wrap up
    - Recapitulate
    - Final Practice
    - Test Objectives
    - Restate relevance & vital points.
  - Confirmation
    - Progress made
    - Arouse interest for next session.

2 THE THEORY LECTURE METHOD

DEFINITION

The lecture is 'a straight talk or exposition' possibly using training aids. The emphasis is on *telling*, preach and teach, the learner's role is thus mainly auditory.

ADVANTAGES

1. A lot of material can be put across in a short time.
2. It is easy on the instructor though hard on the learner.
3. No limit to number of trainees.
4. Can be combined with other methods.

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DISADVANTAGES

1. Learning saturation.
2. The learners are passive, therefore:
   (1) No feedback, therefore the lecturer is inflexible.
   (2) Concentration loss.
3. Requires highly skilled instructor to be effective.
4. Only knowledge facts are gained, no skills are learned.

HINTS

1. To overcome trainee passiveness:
   (1) Keep up motivation by using aids, stressing the relevance of the material and clearly structuring the material.
2. To overcome concentration loss
   (1) Keep it short - never talk for more than twenty minutes without a planned break.
3. To overcome saturation:
   (1) Make sure that trainees can see how and where the lecture is progressing.
   (2) Reinforce the material at every opportunity.
4. The instructor is the only active participant, therefore the following is important:
   (1) Avoid a distracting stance and avoid distracting mannerisms.
   (2) Make the most effective use of voice eg., speak in the normal pitch range and at a conversational pace with natural intonation and at a volume so that all can hear comfortably. Pitch, volume, pace and intonation should be varied for emphasis.
   (3) Be natural.

STANDARD FORMAT

BEGINNING	INTRODUCTION	stress relevance of material outline material to be covered	TELL THEM WHAT YOU ARE GOING TO TELL THEM
MIDDLE	DEVELOPMENT	ensure that the steps in the material are simple, and can be easily followed use aids and examples where possible summarise frequently	TELL THEM
END	CONCLUSION	give a clear summary no evaluation is possible	TELL THEM WHAT YOU HAVE JUST TOLD THEM

USES OF THE LECTURE

Because it imparts a lot of material in a short time, the lecture has the following uses:

1. For background information
2. To introduce a topic
3. To recap or summarise
4. Where it is essential that students be left in no doubt, e.g. safety precautions.

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The lecture *is not*, because of its many disadvantages, an effective means of transferring knowledge. It is best used as a part of a session rather than as a complete session in itself.

- KEEP IT SHORT
- MAKE USE OF AIDS/EXAMPLES
- NEVER LECTURE IF YOU CAN FIND A BETTER WAY

3 THE THEORY LESSON METHOD

The difference between the theory lesson and the theory lecture is that in the lesson the instructor attempts to ensure participation. It is therefore, a more effective way of instructing knowledge-based subjects. This can be done by:

1. Question-and-answer techniques
2. An extensive use of training aids
3. By varying activities.

Like the lecture, the starting point of the lesson is what is already *known*. From there the trainee is guided step-by-step towards the new objective. Since learner response is taken into account, this implies an immediate *feedback*. Theory lessons should, where ever possible be followed up by practise to confirm techniques taught.

ADVANTAGES

Because of participation:

1. There is *feedback*, hence the lesson is flexible and is more likely to achieve its objectives.
2. The learners are mentally *active* and therefore:
   (1) Learning is re-inforced by a sense of achievement.
   (2) Motivation is maintained.
   (3) Saturation and concentration loss will be lower.
   (4) It is only suitable for knowledge based tasks.

DISADVANTAGES

1. The session is easier on the trainee, but is harder for the instructor to prepare.
2. It covers less material than the lecture (but material is likely to be better understood and retained).
3. A lesson plan must be prepared.

USES OF THE THEORY LESSON METHOD

In most situations, especially where complex knowledge is important and where the trainee is going to progress to a practical lesson.

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CONSIDERATIONS FOR THE INSTRUCTOR

The two main considerations are:

1. Questioning technique.
2. How to vary activities.

The question-and-answer technique is a very potent method of instruction since it involves the student actively and proceeds from the known to the unknown (question to answer). Furthermore, the student's answer is a form of feedback from which the instructor gauges the effectiveness of the instruction.

Usually a new activity is employed for each step in the session. If the student is actively involved there is less chance of saturation or concentration loss. Some ways of varying activities:

Film, slide-sequences, programmed learning, copying brief notes, finding material from a text, demonstrating, practical.

KEEP IT SHORT
KEEP IT ALIVE
CONFIRM BY QUESTIONS

4 THE DEMONSTRATION

A good demonstration should include all six of Rudyard Kipling's "Serving Men" - WHO, WHAT, WHY, - HOW, WHERE and WHEN. For the instructor *shows* what to do and how to do it; he also has to *tell* who, where and when to do it, and why it's done. Since seeing is close to doing, the learner will generally be very interested and motivated during a demonstration. However, the demonstration rarely stands alone, ideally being combined with other methods.

ADVANTAGES

1. Saves time - a manual skill can be shown much faster than it can be described and more clearly.
2. Dramatic appeal.
3. Reduces waste and damage (if the correct procedure is shown at the outset).

DISADVANTAGES

The following are drawbacks rather than disadvantages.

1. The demonstration is often impractical where a large class is involved.

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2. Needs meticulous preparation, it must work well.

3. The equipment is often too large or too small or the mechanism might be sealed.

HINTS

1. To be Visible. Make sure that all members can see the equipment and use charts or models if necessary.

2. To be Correct. The demonstration must be thoroughly planned and performed absolutely correctly. Safety procedures can be stressed at this stage, before trainees have had a chance to develop their own techniques of using the equipment.

3. Important controversial points should be settled afterwards.

4. The demonstration should be performed relatively *slowly* and in *clearly-defined steps*. Stand beside a trainee to give an individual demonstration.

5. If the demonstration is to be followed by a practical session, show only those procedures which they will be required to perform.

6. Use the question-and-answer technique for reinforcement.

7. Your commentary should be confined to the main points. Don't distract the trainee from the demonstration.

STANDARD FORMAT

BEGINNING - INTRODUCTION
- Give background theory (by lecture/lesson technique) or consolidate previously learnt theory.
- Explain what you will be doing.

MIDDLE - DEVELOPMENT
- The Demonstration.
- Use question-and-answer technique to relate the theory of your demonstration.
- Stress safety precautions.

END - CONCLUSION
- Bring group together.
- By question-and-answer, check their knowledge and understanding.

- REHEARSE YOUR DEMONSTRATION DOWN TO THE FINEST DETAIL.
- GOOD STAGE MANAGEMENT IS ESSENTIAL.
- SLOWLY IN SMALL STEPS.
- KEEP THE COMMENTARY SHORT; MAIN POINTS ONLY.

REMEMBER: IF THE TRAINEE SEES IT DONE INCORRECTLY IN THE DEMONSTRATION IT WILL BE DONE INCORRECTLY IN PRACTICE.

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5 THE PRACTICAL LESSON: "THE PRACTICAL"

The practical lesson should follow the demonstration in the THEORY/DEMONSTRATION/PRACTICAL progression. In the practical lesson, the *learner performs* the operation/drill/procedure under *controlled conditions*. A practical often falls into four basic categories:

1. Independent Practice - trainees set their own pace working individually.
2. Controlled Practice - trainees work together at pace determined by the instructor.
3. Group Practice - trainees performing together as a team.
4. Pupil and Instructor - trainees work in pairs with alternative roles of pupil and instructor.

ADVANTAGES

1. The practical is the "real thing" hence it is likely to instill confidence in the learner.
2. Safety can be emphasised.
3. The practical offers the instructor a simple and valid method of evaluating the student's performance in terms of the set objectives.
4. Retention increased.
5. Reduces problems of learning transferred from training environment to the real thing.

DISADVANTAGES

1. Thorough preparation and assembly of equipment is needed. Also watch positioning of learner and equipment.
2. Very close supervision is required.
3. Demands placed on productive machines and tools.

HINTS

1. Build up to give practical lessons by theory and demonstration sessions.
2. Be thoroughly prepared.
3. Ensure that the trainee knows exactly what steps must be done and that no more is done.
4. Where possible stand beside the trainee when instructing and observing.
5. If the group is large or the operation is at all dangerous, allow only one trainee at a time to handle the equipment.
6. If the preceding demonstration session was not part of the same teaching session as the proposed practical, it will be necessary to give a re-demonstration before going on to the practical lesson.
7. At the conclusion of the practical lesson, "question-and-answer" check what they have been doing, try to answer any questions they might have.

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STANDARD FORMAT

BEGINNING - INTRODUCTION — see page 49

MIDDLE - DEVELOPMENT
- DEMONSTRATION — see page 46; if the demonstration has been given before this period, a brief re-demonstration will be necessary
- PRACTICAL — very close, constructive supervision.

END - CONCLUSION
- Bring group together
- By question-and-answer, check their knowledge.

REMEMBER:

IF THE TRAINEE DOES IT INCORRECTLY IN THE PRACTICAL - IT WILL BE DONE INCORRECTLY ON-THE-JOB.

6 INDIVIDUAL INSTRUCTION

DEFINITION

Individual Instruction is instruction carried out entirely on a one-to-one basis. Rules established for Theory/Demonstration/Practical still apply, such instruction may form part of a practical lesson for a group of trainees.

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ADVANTAGES

1. Can be used when the work force is at different skill levels.
2. Minute details of the job can be revealed.
3. Strong bond of Instructor-Trainee can be formed.
4. Coaching can be employed.
5. Excellent training transference.

DISADVANTAGES

1. Can easily depart from the systematic approach.
2. Units of learning become too large.
3. Mastery of units ignored before proceeding.
4. Can become time consuming.

HINTS

1. Ensure mastery of each unit.
2. Let the whole job be done through to assess initial level of competency for establishing further requirement.
3. Plan each stage.
4. Place learner in the right position.
5. Let learner participate where sensory skills are involved.
6. Direct attention to hidden aspects.
7. Have the learner do the complete job under supervision and verify complete mastery by talking through the task.

7 THE DISCUSSION

DEFINITION

The simplest definition of discussion is "organised argument". As a training method, the discussion must be *guided* towards specific *objectives*. It is not a fluid, rambling thing. It is purposeful. The discussion, in an unplanned form, often develops spontaneously from the lecture method, or from a question/answer sequence. In these cases, the instructor should be very careful not to allow this to continue, *unless* it is in fact assisting towards the objectives.

ADVANTAGES

This is a very *natural* method; talking something over is often a good way of finding out. It is also an *active* method, since all can contribute.

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LIMITATIONS

1. Group Size. This method will tend to work best with groups of 5-10 trainees.
2. Time. The discussion tends to be a slow way of teaching/learning.
3. Prior Knowledge. Clearly people cannot discuss something they know nothing about. Some preparation is therefore necessary. This is why the spontaneous discussion is not as fruitful as the planned variety.
4. Skills. This method is clearly no use for teaching physical skills, and is therefore limited to the knowledge - and attitudinal - skills areas only.
5. Discussion Leader. Instructor needs skills in discussion control.
6. Not suitable for all subjects. Introductory material, manual work, procedural subjects are not discussion topics.

TECHNIQUES

1. Planning
   (1) Choose the topic carefully, use common source information.
   (2) If the instructor is not the leader, group must choose one to keep control.
   (3) Get the objective (and any sub-objectives) very clear.
   (4) Research the topic thoroughly.
   (5) Plan your introduction to be stimulating.
   (6) Plan at least one lead-off question
   (7) Plan several follow-up questions
   (8) Hold the discussion in a suitable room.
2. Conducting
   (1) Introduction. As for lecture/theory lesson, state the objective very plainly.
   (2) Development (Discussion)
   - Planned questions.
   - See that all have a chance to speak, but keep your own contribution down.
   - Be patient, but keep the discussion moving.
   - Watch the time, dwell on a point only as long as it is profitable.
   - Summarise frequently. A recorder is useful.
   - Be flexible about your plan.

   (3) Conclusion
   - Final summary
   - Test objective
   - It might be wise to plan a follow-up activity.

"It takes nearly three days to prepare an impromtu talk" Mark Twain.

DISCUSSION

- CLEAR AIM
- PREVIOUS KNOWLEDGE BY ALL
- GOOD ATMOSPHERE
- GOOD OPENING
- PLANNED QUESTIONS
- SUBTLE CONTROL
- MAKE ALL CONTRIBUTE

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8 PROGRAMMED LEARNING

DEFINITION

Programmed learning is a relatively modern, *individual* method, and generally follows this procedure:

1. The subject matter, process or skill to be taught is defined, analysed and broken down into its elements.
2. The material is then presented step by step in a carefully arranged sequence.
3. At each step the learners are provided with just enough information to ensure that they can make an active response (i.e. do something to indicate that they are following the programme) before going on to the next step. Material programmed in this way can be presented either in a book form or as continuous rolls to be used in a box with a masking device that exposes one step at a time, or in the form of a tape or film to be used in electronic machines.

KINDS OF PROGRAMMES

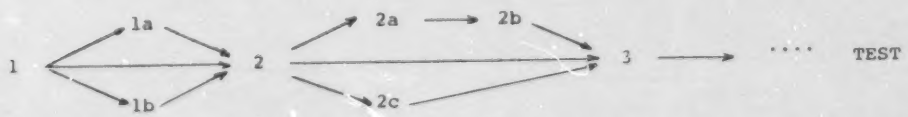
There are two basic kinds of programme. The first is the *linear* method which has the following distinctive features:

1. Material is arranged in small cumulative steps.
2. The learner has to make some kind of active response.
3. The learner is given cues and prompts.
4. The learner is immediately informed whether he is right or wrong.
5. At least 9 times out of 10 the learner is correct and the satisfaction derived from steady progress is assured.
6. The learner is told when a wrong response is made, but carries straight on.
7. The material presented is common to all students. A linear programme is a fixed sequence.

1 ⟶ 2 ⟶ 3 ⟶ 4 ⟶ 5 ⟶ 6 ⟶ TEST

The second is the *branching* method which has the following distinctive features:

1. Information is presented in fairly large units.
2. Multiple choice questions allow for a variety of acceptable answers.
3. The learner's progress largely depends upon the errors made.
4. It allows individuals to follow different routes, a branching programme is not a fixed sequence.



DISADVANTAGES

1. Most programmes are not produced with the specific needs of the user in mind. Irrelevant material may therefore be included.
2. They are complex and time-consuming to design, and very few instructors are competent designers. It is generally not worth the time for an instructor to

produce a new programme.

3. They are not suitable for subjects which are liable to change.
4. Cheating is a problem, but probably exaggerated.

USES

Notwithstanding these disadvantages, programmed learning has the following valuable uses:

1. For remedial work.
2. For extending trainees current knowledge.
3. Where relatively complex mental skill is involved.

9 QUESTIONS AND REVISION

The proper use of questioning is extremely important. Good questions can stimulate, keep trainees mentally active, even goad some into doing some reflective thinking. Think back to the princip[illegible] of maximum activity. Most job-instructors are weak in this *skill* and consequently their effectiveness suffers.

THE AIM OF QUESTIONING

The aim of questioning is to provide *feedback*. Questioning is a *skill*, but, however, it is a skill that must be learned and practised. To apply the technique effectively the job instructor should know:

- The purpose of questions
- How to put questions
- How to receive answers
- How to receive questions

THE PURPOSE OF QUESTIONING

There are three reasons for asking questions:

1. To make learners reason for themself - TO TEACH.
   "What do you think will happen if I pull this lever?... Sally, you show me."
2. To make sure a learner has the knowledge - TO TEST.
   "Tell me Fred - how many metres of wire are there on this drum?"
3. To make the learner actively alert.
   "What happens after that Sally?... I didn't expect you to know so watch this next step carefully."

Sometimes they are used to :

1. Substitute nondemanding polite speech for telling the learner what to do.
2. To express feelings in an indirect way.
3. Tell the learners we disapprove of their action.

HOW TO PUT QUESTIONS

When asking questions:

1. Phrase them clearly.
   (1) Grammattical
   (2) Structured objectively
   (3) Singular in concept
2. Indicate the form of response you want.
3. If it's to a group:
   (1) Question - pause - name the respondent.
   (2) Make the whole group think.

HOW TO RECEIVE ANSWERS

When receiving answers:

1. Praise correct answers, sympathetically deal with incorrect ones.
2. Do not "parrot" - it's a nervous habit.
3. Only receive answers presented in an acceptable manner, eg. only one speaker at a time.

HOW TO RECEIVE QUESTIONS

When receiving questions from an individual or a group:

1. Adopt a manner that will encourage further questions.
2. Repeat the question if it is not audible to the rest of the group.
3. If the group should know it, redirect it - but keep control.
4. If its irrelevant but sincere, deal with it quickly
5. If its a "Red Herring" - no fish today!
6. If you do not know the answer - *Never Bluff*. A simple, "I do not know, I'll let you know later", is far better.

SOME HELPFUL HINTS

1. Do not ask YES or NO response questions, it encourages guessing.
2. Do not ask knowledge questions to a learner performing a skill, wait until the end of the step.
3. Avoid questioning of skills.
4. Avoid the need for complex explanations.
5. Do not air your knowledge - keep your answers short, clear and to the point.
6. Do not ask critical, dishonest or closed questions.

SUMMARY

GOOD QUESTIONS	-	Teach, Test and Activate through correct use.
METHOD	-	QUESTION - PAUSE - NAME GROUP MEMBER
AVOID	-	Ambiguous questions 50/50 questions Skill questions Complex explanations Verbosity

REVISION

Revision is used to maintain a standard already reached. Some repeated instruction may be necessary to reach this standard. Care should be exercised not to bore the learner, if revision is to be successful. Whenever possible:

1. Tackle the material in a new way.
2. Use the question and answer technique to ensure the learner feels a sense of progress.
3. Revise in a practical setting.
4. Prepare well.

REVISION	
TEST	- At the start as a foundation.
DETERMINE	- To see what revision is needed.
REVISE	- New way. Use Question/ Answer Method.
TEST	- Confirm before proceeding.

10 USING YOUR VOICE

As a concluding section to Part 4, it is appropriate to make a few observations about using your voice, in the role of an instructor. It will not go unnoticed that most of the aforementioned methods require the instructor to converse with the learner. Using your voice correctly will help a great deal in "putting it over".

These are the main points to consider when conversing with trainees:

1. Be clear, concise and distinct, without being unnatural.
2. Don't be monotonous either in pitch or choice of words.
3. Put verbal emphasis where it is needed.
4. Speak slowly; people generally speak too quickly when instructing.
5. Keep the volume up and don't let it fall away at the end of a statement; the vital words are usually found there.
6. Pause after you have made an important point - let it sink in.
7. Pause often to think about what you are going to say next. The pauses are never so pronounced to the listener.

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AIDS TO THE JOB–INSTRUCTION

PART 5

ELEMENTS PRESENT IN THE JOB-INSTRUCTION SETTING

COMMUNICATIONS, MOTIVATION AND HUMAN RELATIONS

TEN PRINCIPLES OF GOOD JOB-INSTRUCTION

INSTRUCTIONAL METHODS

we are here

AIDS TO THE JOB-INSTRUCTION

1. Range of Aids
2. How do they help a learner?
3. Notes and Precis

TACKLING THE JOB-INSTRUCTION

CONFIRMING, RECORDING AND ADMINISTERING THE JOB TRAINING

INTRODUCTION

In part 1 we made the point that people learn about 70% of the knowledge through sight. They also learn much of their practical skills through the same sense, although obviously the bulk of this learning comes through the sense of touch. It is clear that we will be able to dramatically increase the effectiveness of training explanations, if we can SHOW the subject, rather than rely on the learner to merely listen.

"A picture is worth a thousand words"
Confucius.

WHAT ARE TRAINING AIDS

Aids are simply devices (normally other than the real thing) which help the *trainee to learn.*

PURPOSE OF TRAINING AIDS

All aids must help the trainees to learn, through *assisting* the instructor to "put over" the lesson. They must never replace the instructor, or become so complex as to confuse the learner.

The instructor has to present material in such a way that it is:

1. Meaningful
2. Memorable

Training Aids, or "audio-visual" aids can assist greatly in this task.

1 RANGE OF AIDS

There is a vast range of aids which can be used. Each has its particular advantages and disadvantages. Not all will be available. These can be categorised under the following headings:

1. Still Pictures or Illustrations
   - Chalkboard
   - Magnetic boards
   - White boards
   - Graphs
   - Flip Charts
   - Posters
   - 35mm Slides
   - Film strips
   - Overhead Projector (OHP)
   - Epidiascope
2. Motion Pictures
   - Films 16mm/8mm (live)
   - Films 16mm/8mm (animated)
3. Television
   - Live
   - Audio/Video Recording
   - Programmed instruction

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4. Models
   - Cut away
   - Simplified
   - Scaled
5. Computers
   - Simulation, aided instruction and learning
6. Programmed Instruction
   - Texts
   - Construction
7. Written Material
   - Books
   - Precis
   - Handouts

ESSENTIALS OF AIDS

Any useful visual aid must be:

SIMPLE	-	to make, maintain and understand.
BRIEF	-	to stress only the main points
LARGE	-	to enable essential details to be seen by all.
STIMULATING	-	to interest and make the essential points stand out.

For further details see Appendix 1.

2 HOW DO THEY HELP A LEARNER?

The human brain "learns" by sensory experience, i.e. by recording what we see, hear, feel, say and smell. The more senses that are involved in the learning situation, the better we tend to learn.

All the training aids involve more than one of the student's senses. Material presented in this way tends to be clearer and more memorable. We remember what we *see* better than what we *hear* and almost all training aids are visual to some degree. But *no training aid is a substitute for seeing or doing the real thing.* Whenever practicable, the actual object or process should be used.

> *"I hear and I forget;*
> *I see and I remember;*
> *I do and I understand."*
>
> *Old Chinese Proverb*

WHEN CAN TRAINING AIDS BE USED?

Aids can be used at all stages of the learning process as follows:

1. To Prepare the Learner: A simple chart or poster can stimulate interest, give or review background knowledge.

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2. In the learning situation itself: A range of aids can be used to emphasize key points, show important relationships, explain complex material, retain interest, etc., etc.

3. To reinforce what's been learnt: A chart or poster summarizing the main points.

WHEN SHOULD AIDS BE USED?

1. When the session has been planned and the objectives are clear. Aids will assist you achieve the lesson objectives, but they are not an end in themselves and are no substitute for a session-plan.

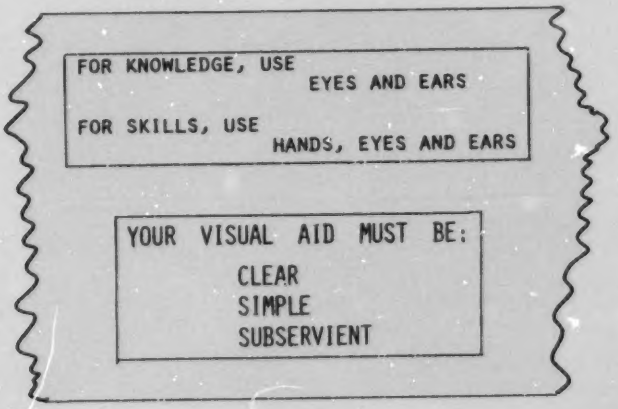
2. When the real thing is not available.

3. When it will help make the point better than you can on your own. Otherwise it will be a waste of time and effort.

CHECKLIST

Before making or using an aid ask yourself:

1. Is it necessary?
2. Will it help the learner?
3. Does it involve more than one sense?
4. Is it the best kind of aid for the job?
5. Should more than one kind of aid be used?
6. What size, colour, type of presentation?
7. Is it simple?
8. Is it accurate?
9. Is it available?



3 NOTES AND PRECIS

INTRODUCTION

Many lessons cannot be assimilated all at once, so some means must be devised to enable the trainee to recall the important information/skills of the lesson. Unless the subject is well documented in textbooks or manuals, which the student posses, some tangible memory-aid must be provided for later reference.

NOTES AND PRECIS

Definitions. Notes are what the trainee writes down.
Precis are prepared handouts which are issued.

NOTES

Uncontrolled Notetaking. Notes taken down as the lesson progresses, without any assistance from the instructor, are often a feature of the lecture technique.

1. Advantages
   (1) The actof writing itself can be a memory-aid.
   (2) The trainee will be able to read the notes better.
   (3) The student's own notes will mean more than someone else's.
2. Disadvantages
   (1) Requires practise and experience.
   (2) Writing distracts the lesson.
   (3) The important points often do not become clear until the lesson is over.
   (4) If the lesson is not followed closely, the whole exercise is pointless.

Controlled Notetaking. Here the trainee writes exactly what the instructor directs:

1. From the chalkboard, chart, OHP, etc.
2. By dictation.
3. Advantages
   (1) From the chalkboard, etc. there is a certain amount of quality control.
   (2) By dictation. NIL
4. Disadvantages
   (1) Although there is more chance of quality control over notes given this way, there is still the likelihood that no two sets of notes will be identical.
   (2) Both methods are time consuming, especially by the dictation method, where the fastest speed can be only that of the slowest writer.

PRECIS

The two advantages of the precis over notes are:

1. They take practically no class-time to hand out.
2. Everyone gets the same material, and the instructor, rather than the trainee, controls their quality.

However, there is a danger that some trainees will 'file' the precis away and never refer to it. To guard against this, precis should be:

1. Active
2. Attractive

(1) Active. The precis should not only give the essential material, it should also include some task which the student can complete, and the instructor check, to ensure that the handout has been read and understood.

(2) Attractive. The precis should be as professionally produced as possible, and contain only the main points of the topic. It should be expressed in simple terms and be clear at a glance.

Three examples of precis are attached as Appendices 2 to 4.

	TYPES OF INSTRUCTIONAL AID							
	Still Pictures	Motion Pictures	Television	Audio Record-ings	Models	Stimulation	Programmed Instruction	Text books etc.
Learning Factual Information	M	M	M	M	L	M	M	M
Learning to Make Identifications	H	H	H	L	H	H	M	L
Learning to Make Perceptual Dis-criminations	H	H	H	H	H	H	M	L
Learning to Follow Procedural Sequences	M	H	H	M	H	H	H	M
Learning Principles and Relationships	M	H	H	L	M	H	M	M
Learning to Make Decisions and Solve Problems	L	M	M	L	M	H	L	L
Learning to Perform Manual Skill Actions	L	M	L	L	M	H	L	L
Developing Desirable Attitudes, Opinions or Motivations	L	H	H	M	L	M	M	M

L = LOW EFFECTIVENESS M = MEDIUM EFFECTIVENESS H = HIGH EFFECTIVENESS

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An Information Sheet

DOUBLE TUBE SPIRIT LEVEL

Unit IV
Topic 6

INTRODUCTION

This information sheet provides basic information on the use of the double tube spirit level.

SUBJECT MATTER

A level is used to determine if a surface is level, or if a surface is plumb. The term LEVEL means that a straight line or plane being tested is truly horizontal, or parallel to the surface of a body of still water. The term PLUMB means that a line or surface is truly vertical, or lies at a 90 degree angle to a level surface.

The glass tubes are almost, but not quite, filled with alcohol, which flows easily and does not freeze at ordinary temperatures. The tube is bent on a slight arc, as shown in figure 1; and after it has been filled almost full, it is sealed. The tube is then embedded in plaster of paris, in a bracket fastened into the body of the level.

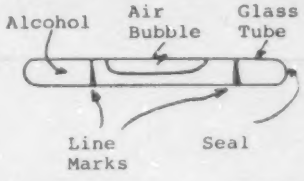

FIGURE 1

The movement of the air bubble in the tube is very sensitive to any change in position of the level.

In testing for level, the tubes located at A, in figure 2, are used. In testing for plumbness, the tubes at each end, at B, are used. Readings may be taken at each end of the level.

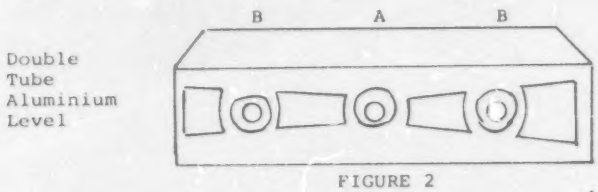

FIGURE 2

Advantages of double over single tube levels are:

1. Accuracy of level may readily be checked.
2. When level is picked up, one or more glasses are in position for reading.
3. If one glass in a level should be broken, other glasses can be used.

QUESTIONS

1. What purpose is served by line marks on the tube?

   .....

2. From which end of the level should readings be taken?

   ....

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RECIPROCATING PUMPS

INTRODUCTION

Direct-acting steam reciprocating pumps have many features of simplicity, reliability, and economy, and render satisfactory services where the steam conditions are moderate in pressure, temperature, or superheat. Some outside reading and study is required on this subject matter. Careful preparation of the following reading assignment will make your work easier in this area, and improve your value to the organisation.

DIRECTIONS

Read Chapter 11, pages 115-123, in Engineering, Operation and Maintenance. Study the assigned portion of the text carefully, and answer the following questions. Write your answers in the space provided.

QUESTIONS

1. What two factors determine the displacement capacity of a reciprocating pump?

   A. _____

   B. _____

2. What three measurements are conventionally used to describe the size of a direct-acting steam pump?

   A. _____

   B. _____

   C. _____

3. Which type of steam valve gear is most suitable for steam pressure under 200 psi? _____

4. If an operating pump suddenly loses pressure on one stroke, what is the probable cause? _____

5. If a reciprocating pump is run with a shorter length of stroke than that stamped on the nameplate, what will be the result? _____

   _____

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JOB TRAINING SHEET

PART 1 ENTERING A SALE

X DEPARTMENT STORE

M.RS. R. ANYBODY
10 MAIN ST. ANYWHERE
TELEPHONE. 122,456

Dept	Book	Exmd. by	Code 2/23 $	c
876	372	RM		
1 x Sun Dress			39	95
TYPE OF SALE ENTRY			$ 39	95
Signature R.S. Anybody				

01329=15

POINTS TO NOTE:

1. Establish customer has a charge account - company card/office check.
2. Record name and address - all initials - street number - suburb.
3. Enter Department number and Assistant's number.
4. Brief description of goods - serial numbers where relevant.
5. Full price - print boldly/clearly.
6. Print ENTRY alongside total.
7. Have customer sign docket - check?

PART 2 REGISTERING A CASH SALE IN THE N.C.R 51 REGISTER

Always use the correct method each time, this ensures rapid and accurate registration and reduces the possibility of error. Aim to have your register always, just right.

METHOD TO FOLLOW

1. Be sure of price to customer, call it out to the customer.
2. Receive money, call amount tendered, place customers money on change plate.
3. Clear register and record sale with R.H.
4. Compare receipt with indicator.
5. Remove receipt, place on change plate.
6. Make change to amount tendered and place on top of receipt on change plate.
7. Place customers money into register drawer and close drawer.
8. Count change to customer coin by coin and note by note.
9. Place receipt in parcel or in hand.
10. Hand customer parcel saying THANK YOU (SIR/MADAM or BY NAME) AND SMILE YOUR APPRECIATION.

MODE OF SALE, AS LAID DOWN, MUST BE FOLLOWED, WITHOUT DEVIATION.

KEYS				
50c	$1	$2	$ (5 (10 (20 (50	
20c	10c	5c	2c	1c

LAYOUT OF CASH DRAWER FOR THE NCR 51 REGISTER

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ELEMENTS PRESENT IN THE JOB-INSTRUCTION SETTING

COMMUNICATIONS, MOTIVATION AND HUMAN RELATIONS

TEN PRINCIPLES OF GOOD JOB-INSTRUCTION

INSTRUCTIONAL METHODS

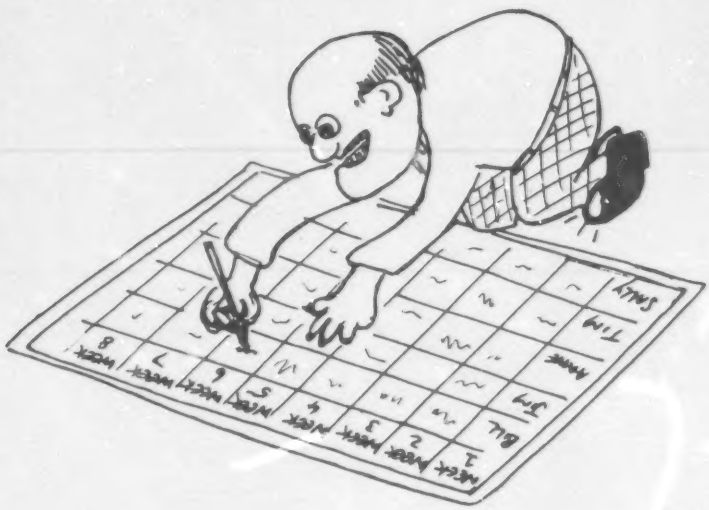
AIDS TO THE JOB-INSTRUCTION

TACKLING THE JOB-INSTRUCTION

CONFIRMING, RECORDING AND ADMINISTERING THE JOB TRAINING

TACKLING THE JOB-INSTRUCTION

PART 6



1. Preparation
2. How to make a Job Breakdown
3. How to make a Training Task Breakdown
4. Attitudinal Training
5. Self Preparation

we are here

[1] PREPARATION - THE FOUNDATION OF INSTRUCTION

INTRODUCTION

Preparation is the crucial element in all instruction, particularly in on-the-job training, where time is often a factor. To make best use of the time available, the process must be logical and systematic.

Before starting detailed preparation, the instructor must decide on the best method of presenting the information so that the trainee can learn effectively. The material covered thus far by the handbook, namely:

[1] elements present in the job-training, setting;

[2] communication, motivation and human relations;

[3] principles of good job-instruction;

[4] instructional methods; and

[5] aids to instruction,

contains all the information necessary to make a qualified judgement. Providing answers to the following questions will make this initial task easier.

WHAT ARE THE AIMS?

(1) What is the instructional problem that establishes a need for the job instruction, and what is the overall aim? (If this has not been stated by someone else, a brief written statement should be produced.)

EXAMPLE 1.

TITLE OF PROGRAMME: The ABC Keyboard.

STATEMENT OF NEED: A new ABC Keyboard will be used, as a standard data input machine for all the company computer terminals. Skills in using this keyboard will be required by all staff having a need to operate the company computer or its terminals.

EXAMPLE 2.

TITLE OF TRAINING SESSION: Completing Customer Sales Slips.

STATEMENT OF NEED: All staff making customer sales, must complete sales slips which are part of the company accounting process. Skills in making out these slips are essential to ensure there is no greater than a maximum 2% error per month, with no more than six department errors per day.

(2) What are the consequences of not providing the job instruction? (If this has not been stated by someone else, a brief written statement should be produced.)

EXAMPLE 1.

TITLE OF SESSION: The ABC Keyboard.

STATEMENT OF CONSEQUENCES OF NOT PROVIDING JOB TRAINING: Since the keyboard is a basic device used in many departments, staff without previous training on this machine would be greatly hampered, and company operations would be frustrated.

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WHAT ARE THE LEARNING OBJECTIVES?

(3) What is the specific aim (objective) of this particular session?
(This must be a simple clear statement expressed in absolute terms with the subject being *the trainee*.
It *must* be a *learner based*① statement containing the following elements:

- An *action verb*② describing the *performance* required.
- The *standard*③ that the learner must achieve.
- The *conditions*④ under which the performance is to be made.)

EXAMPLE 1.

Upon completion of this session of instruction, the trainee① will demonstrate② the correct method of completing a weight and balance check, using a Type 34④ machine. The operation is to be performed without error③.

EXAMPLE 2.

Upon completion of this session of instruction, the trainee① when requested to give change in a sales transaction, will accept② the payment, register② the payment, and return② correct change with no error③ at any stage and using no calculating device④.

These forms of objectives are more than adequate for job training requirements. They are invaluable at this stage because:

a. They are an ABSOLUTE, SIMPLE, PRACTICABLE, statement of the intent of the session for both INSTRUCTOR AND LEARNER.

b. They lead logically to the development of the MEASURES an instructor uses to determine if the trainee has learned.
(This subject will be covered in part 7 of the handbook)

SUBJECT MATTER: WHATS INVOLVED?

Do I know the job well enough to develop the subject matter?

(This will require the instructor to establish:

a. Is it a knowledge fact, or skill, or both that is involved?

b. What is the sequence of job components?

c. What are the important steps and key points?

d. What are the learning stages and instructing points?)

The requirements for paragraphs a. b. and c. are met through the production of a JOB BREAKDOWN SHEET FOR TRAINING and d. is catered for by an associated TRAINING TASK BREAKDOWN SHEET.

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2 HOW TO MAKE A JOB BREAKDOWN

A great deal of material has been written on this particular subject, much of it unnecessarily detailed and complicated. However, the original TWI Job Breakdown of 1941 often appears in similar forms. It is not uncommon to see it referred to as a:

- Job Analysis Chart
- Task Analysis Chart
- Work Analysis Chart
- Breakdown Guide
- Operation Sheet
- Job Blueprint
- Work Sheet

= Job Breakdown Sheet

PURPOSE OF A JOB BREAKDOWN

A well prepared Job Breakdown is used to provide sufficient job details to serve as a standard step-by-step guide so that a person, unfamiliar with the job, can perform each step of the operation satisfactorily.

The Job Breakdown is an invaluable preparation aid to the instructor, *but it is not a* detailed instructors guide, nor should any attempt be made to combine the Job Breakdown Sheet and the Training Task Breakdown Sheet. A recommended suitable format to use for recording a JOB BREAKDOWN, is shown below. *The steps* of an operation are recorded as a single, brief statement containing an *action* verb; for example "*adjust* the regulating arm". (The choice of this action verb, action word, is important for it holds the clue as to whether the operation is a skill, knowledge, an attitude or a combination of these behaviours. Common action verbs to use are shown in appendix 1.)
A key point is a factor related to a step, it is the "key" to doing it correctly. This section is not meant to record every procedural action that might be done.

JOB BREAKDOWN SHEET

BREAKDOWN FOR: TRAINING NEW WORKER NO: JB4

DEPARTMENT: PLASTIC MOLDING (47) WRITE/REVIEW DATE 2 SEP 81

JOB: PRESS MOLD OPERATOR OPERATION: HANDPIECE PRESSING

IMPORTANT STEPS (WHAT TO DO) A logical segment of the operation, where something happens to advance the work.	KEY POINTS (HOW TO DO IT) Anything that may: - Cause the work to be scrapped. - Injure the worker. - Make it easier to do.
1. Clean mold in preparation for inserts.	Knack – Mold wide open. – Use brush and compressed air together. Safety – Mold and Platen may be hot wear gloves. – Report cracks or rust.
2. Lubricate mold with aerosol spray provided.	Knack – Spray from about 30 cm above the mold. Safety – Keep away from bare skin and eyes. Hint – Use only enough to make
6. Remove handpiece from the mold and inspect the surface.	Safety – Mold and Platen are hot. Hint – Sticking indicates insufficient lubricant or mold not cleaned properly.
7. Place satisfactory handpiece on the support rack and repeat operation from 1.	Hint – Hand pieces are still warm and subject to warping, ensure they are located in support racks correctly.

JOB BREAKDOWN SHEET FORMAT

HINTS ON WRITING A GOOD JOB BREAKDOWN

1. Consider if a Job Breakdown is necessary
   - Are the employees going to require a full explanation of the job?
   - Is the job complicated in any way?
   - Will it help the Instructor to think out what to get across?
2. Head Up Sheet
   - Clear and simple for recording and reference.
   - Date to show when last reviewed.

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3. Decide on Important Steps
   - Do the job or watch an experienced worker do the job.
   - Work to definition: A logical segment of the operation which substantially advances the work.
   - Start each step with an action verb.
   - Work right through job or operation in a logical sequence.
   - Test each step by asking; "Is it a logical segment of learning.

4. Decide on Key Points
   - Do the step or watch an experienced worker do the step. Get them to talk you through the step.
   - Work to definition:
     Anything in this step that would make or scrap the work?
     Anything to make the difference between success or failure?
     Anything to injure the worker - Cause damage?
     - Any knacks or tricks?
     - Any special timing?
     - Any special information?
   - Check all key points located and noted before proceeding to the next step.
   - Repeat for all steps.

5. Check the Breakdown
   - Do the job again from the breakdown.
   - Add or amend key points as necessary.
   - Try it out on a learner using good instruction (4 methods), set to a TASK BREAKDOWN SHEET FOR INSTRUCTING.

Three well prepared TWI Job Breakdowns[1], covering a range of vocations, are included as appendix 2 to this part of the handbook. These examples will show, that with relative ease, most job operations lend themselves to this approach. The heading portions have been abridged to be illustrative only. However, the value of these examples liesin the Important Steps and Key Points.

3 HOW TO MAKE A TRAINING TASK BREAKDOWN

PURPOSE OF A TRAINING TASK BREAKDOWN

We have seen how a well prepared Job Breakdown provides a step by step guide to satisfactory performance of a job. Furthermore, it provides the instructor with an overview of the instruction required. A Training Task Breakdown Sheet will be used to plan, in more detail, steps associated with the Job Breakdown. The Training Task Breakdown may cover the complete operation (if it is a simple one) or alternatively one important step. It differs from the Job Breakdown in a number of ways:

1. The task involved is expressed as a *training objective* to be met by the learner.
2. Tools, Equipment, Aids and References are listed.
3. The format of Beginning-Middle-End is followed.
4. A Confirmation method is stated.

---

1. *Should it be necessary to deal with this in more depth, details may be obtained from the Industrial Training Service of the Department of Labour, New Zealand.*

   These particular examples are taken from a range of Job Breakdowns used by the ITS in their Job-Instruction Programmes.

A suitable format to use for the Training Task Breakdown Sheet is shown below. This example is associated with the Job Breakdown Sheet shown on page 73. The learning stages and instructional points follow much the same principle as for the Job Breakdown, with stages being specified using action verbs. Sequencing of stages should follow the "best for a learner principle", a suggestion for arranging more difficult operations is shown in appendix 3.

TRAINING TASK BREAKDOWN SHEET

JOB BREAKDOWN NO: JB 4

DEPARTMENT: Plastic Molding (47)

TASK BREAKDOWN NO: JB 4(6)

DATE: 2 September 81

JOB: Press Mold Operator

OPERATION: Handpiece pressing

TASK: Step 6, Removal and Inspection of Molded Handpiece.

OBJECTIVE: Upon completion of this training task, the trainee will demonstrate correct removal and inspection of 4 completed handpieces, using the Type L4 Mold as per Company Operating Procedures at the agreed production rate.

TOOLS/AIDS/EQUIPMENT:
1. Samples of Standard, and Sub-standard handpieces.
2. Operating Procedures
3. Safety equipment
4. Mold tools

BEGINNING

TIME: (If Appropriate)
PRELIMS: Put trainee at ease and make sure the objective is understood.
REVISION: Get trainee to review operation thus far to tie in.
QUESTIONS: Temperature of mold, time for cure, safety procedures in event of _____

MIDDLE

STAGE (WHAT IS LEARNED)	INSTRUCTION POINT (HOW IT IS LEARNED)
1. Opening press at the end of the curing period.	- Watch for alarm to open. - Position learner to watch closely as press opens - Look for faulty work. - Observe moulded piece breaking free.
2. Releasing sticking piece using the correct tool.	- Demonstrate releasing method using Brass scraper, emphasise safety. - Discuss sticking and revise the 5 reasons why sticking occurs (covered in Step 2)
8. Inspect hand pieces for faults and surface damage.	- Compare samples and product. - Explanation of various faults. - Holding pieces correctly. - Discuss the importance of quality control.

END

QUESTIONS: To/from learner (note questions from learner - clue to understanding)
TEST AGAINST OBJECTIVE: O.K. now learner does 4 on own.
SUMMARY: Praise success, advise of remedy in case of failure, programme next step of training.

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4 ATTITUDINAL TRAINING

INTRODUCTION

In Part 3 of this handbook the topic of 'an employee's attitude' was introduced. It was concluded, that there are many problems associated with developing the correct attitudes and measuring changes that may have resulted from job-instruction. The Problems include the following:

1. It is not always easy to decide whether a particular attitude is held by a person. For example, a person could recognize the dangers in smoking and yet, in terms of observable behaviour, smoke heavily.
2. The problem is made more complex by not being able to observe directly a person's beliefs and feelings.
3. Sometimes, what people express as an opinion will not be matched by what they do in practice.
4. At best, the behaviour exhibited by a person is only an indicator of the presence of an attitude.

Two important points emerge from a study of these problems. They are:

1. Only observable behaviours should be assessed by the instructor. This means, a trainee would fail a training objective if a number of safety precautions were not observed (Skill or Knowledge). However, the failure might alternatively be described as a lack of safety conciousness (Attitude).
2. Instructors can contribute to the development and enhancement of the attitudes that affect job-performance.

The reasons for the emergence of the above points are:

1. Assessment of Skills and Knowledge is a far more reliable task; it only relies on observed performance.
2. Development of attitudes is a long-term process which spans a longer period than job-training. The major concern for the job-instructor is that the employee performs as required, with the attitudes supporting that performance developing initially during training, and consolidating while on-the-job.

PROCEDURES

Attitudinal Objectives are not written in the same manner as the learning objectives for Skills or Knowledge, shown on page 71. Since the observable behaviour is all that is of interest, the objective is written as a clear statement that specifies the required behavour.

There are a number of techniques available to determine the exact nature of the required behaviour. Goal Analysis[1] is probably the easiest for the Job-Instructor to

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1. *Robert F. Mager, "Goal Analysis", Fearon Publishers, 1972. This small, and most readable, book explains in simple terms the process of Goal analysis.*

use. The following explanation and example is provided of how Goal Analysis can be used:

Goal Analysis consists of three steps:

Step 1 Write down the goal. Express the goal in the clearest terms possible. If you cannot find action verbs this does not matter. The list of verbs in Appendix 1 should be used if possible. The main point of Step 1 is to describe 'what you want the trainee to do'.

Step 2 List the performances that define the Goal. This step requires you to write down everything that related to the goal. No special order is required.

Step 3 Refine the List. Delete duplications, items that are not expressed in action words. Carry out the first two steps for any vague statements that are left. Finally, you should end up with a series of statements that contain observable performance.

Step 4 Produce an evaluation (measurement) guide for the attitudinal objective. It must list the behaviours (which indicates the presence of the desired attitude) and is in effect the 'attitudinal objective'.

EXAMPLE 1

The trainee is to value the need for correct handling of sulphuric acid (Attitude).

a. Goal The goal is 'having a positive attitude towards the correct handling of sulphuric acid'.

b. Performances. Those things considered relevant are:
   (1) Wears protective clothing.
   (2) Allows no metal other than lead to contact the acid.
   (3) Does not smoke when handling acid.
   (4) Appreciate the dangers involved.
   (5) Safety first equipment on-hand and serviceable.

c. Refine List
   para (4) is too vague, it could be refined to state:
   (1) Use clean and serviceable tools and equipment.
   (2) Observe correct acid levels.
   (3) Mix acid with distilled water.
   (4) Transport containers in an approved manner.
   (5) Does not indulge in 'horseplay'.

d. Evaluation Guide. The guide could be prepared to direct the instructor's attention to notice where the following safety and handling performance indicators are not observed:
   (1) Wearing protective clothing.
   (2) Allows no metals other than lead to come near the acid.
   (3) Does not smoke when handling acid.
   (4) Prepares safety equipment and places it on-hand.
   (5) Uses clean and serviceable tools and equipment.
   (6) Observes correct acid levels.
   (7) Observes correct mixing procedures.
   (8) Picks up and carries acid correctly.
   (9) Does not indulge in horseplay.

EXAMPLE 2

The trainee is to value the need to work in harmony with other employees.

Evaluation Guide. During the daily work activities while in the course of job-training, the instructor should be alert for such indicators as:

a. Sharing a work-load.

b. Respecting the privacy of others.

c. Respecting the property of others.

d. Giving assistance to others.

e. Co-operating with others.

EXAMPLE 3

The trainee is to value the need to prevent fires in the work setting.

Evaluation Guide. (as for example 2) Indicators include:

a. Care in the use of electric equipment.

b. Care in the use of flammables.

c. Safe disposal of lighted matches and cigarettes.

d. Refrains from smoking in restricted areas.

e. Proper use of wall heaters.

f. Correct loading of electrical points.

g. Correct use of extension leads.

FINAL POINTS

1. Attitudinal Objectives are not definitive statements which indicate the presence or absence of an attitude; they only act as a guide to the instructor.

2. It is not always necessary to write objectives for all attitudes. Some attitudes can be written as part of the standard statement of performance of a learning objective.

3. Once the indicators have been established they can be incorporated into the Training Task Breakdown as a guide to the instructor.

5 SELF-PREPARATION

In the last three sections we talked about preparation that is required before the actual training is undertaken. The one other thing that remains to be covered in this part of the handbook, is the self-preparation that the instructor must do.

If the instructor is a full time trainer, then there won't be nearly as much to do as when instructing efforts are few and far between. Nevertheless, there are certain areas in self-preparation that should be reviewed. These are:

1. Source material should be reviewed, changes may have occured in procedures etc.
2. Learn the background of the people to be trained. This can assist in the human relations side of the task and might provide insight into difficulties or problems with learning.
3. The administrative details if any of the training is to take place away from the job-setting such as:
    1. time and place
    2. bookings
    3. aids needed.

APPENDIX 1

EXAMPLES OF ACTION VERBS

In order to help those of you who are writing objectives for the first time the following list of verbs (action words) is divided into 3 categories. Remember that these are no more than an aid; if at all possible you should choose that word which illustrates precisely the action that the successful performance of the job requires.

KNOWLEDGE

computes	extracts	marks	solves
calculates	finds	names	spells
categorizes	identifies	notes	selects
cites	illustrates	picks	specifies
converts	isolates	proves	translates
defines	indents	reproduces	tabulates
differentiates	labels	relates	underlines
divides	lists	selects	verifies
explains	locates	states	weighs

SKILLS

adapt	drill	manipulate	receive
adjust	demonstrate	mark	recondition
act upon	draft	monitor	record
align	encode	moun	replace
assemble	ensure	maintain	repair
balance	edit	observe	recognize
build	examine	open	readjust
climb	file	operate	recover
calibrate	finish	order	secure
cause	fit	overshoot	sort
check	hold	overhaul	select
carries out	handle	practice	strip
compile	inspect	paint	test
check	install	place	turn
connect	lower	position	tighten
construct	locate	post	take
draw	lifts	prove	torque
detect	lubricate	raise	write
diagnose	make	reassemble	wrap

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ATTITUDE

argues	discusses	indicates	reproduces	verifies
agrees	differentiates	joins	replies	
answers	distinguishes	locates	relates	
alters	disagrees	modifies	separates	
completes	explains	names	solves	
chooses	follows	produces	uses	
describes	helps	prepares	value the need	

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SAMPLES OF TWI JOB BREAKDOWNS

EXAMPLE 1

JOB BREAK-DOWN SHEET FOR TRAINING EMPLOYEE ON NEW JOB

Bench lathe job.

PART - Governor Brake Disc. OPERATION - Drill, bore, ream and face

Important Steps in the Operation Step-A logical segment of the operation which substantially ADVANCES the work.	Key Points Key Point - Anything in a step that might: Make or scrap the work. Injure the worker. Make the work easier to do - i.e. "knack", "trick", special timing, bit of special information.
1. Chuck	Chuck squarely - no chips or burrs.
2. Indicate	Low speed.
3. Centre drill	Angle - give drill double bearing.
4. Drill	Lips even. Feed even. High for chip clearance. Clean drill.
5. Reverse piece	
6. Bore	Feed even and slow.
7. Plug gauge	Enough stock for reaming.
8. Ream	Feed evenly. If bell-shaped check tool.
9. Set cross slide ...	No back lash.
10. Turn	Feed evenly. Keep "drag" for good finish.
11. Face	Keep "drag" for finish.
12. Gauge hole-plug gauge ...	Never remove piece - "feel".
13. Check	
14. Remove and place in tray ...	Don't drop.

A supervisor in a machine shop did this break-down.
He uses this break-down "as it is" for workers who have had other bench lathe experience.
For new workers he uses one or two of the above steps as a separate instructing unit.
He might make a Training Task Breakdown for each of these smaller units.

EXAMPLE 2

JOB BREAK-DOWN SHEET FOR TRAINING WORKER ON NEW OPERATION

PART - Supplies Account Voucher. OPERATION - Entering Invoices and Credit Notes

Important Steps in the Operation Step - A logical segment of the operation which substantially ADVANCES the work.	Key Points Key point - Anything in a step that might: Make or scrap the work. Injure the worker. Make the work easier to do - i.e., "knack", "trick", special timing, bit of special information.
1. Collect invoices ...	Buying Department - Mr Scott.
2. Sort invoices	Same name and address. Check Buyer's name.
3. Select voucher	Check name and address. (New voucher may be required.)
4. Enter on voucher ...	Credits in red. Date of invoice. Total of invoice. Department as stamped on invoice.
5. Enter voucher number on invoice.	Top right-hand corner.
6. Filing	Voucher to metal drawer. Correct order. Invoice to Supplies Account Section.

A supervisor made this break-down in 6 minutes.

The supervisor used this break-down "as it is" for staff who have had office experience.
For new staff each of these steps might constitute a "Training Task" by itself and a Training Task Breakdown for each of these smaller units could be raised.

EXAMPLE 3

JOB BREAK-DOWN SHEET FOR TRAINING WORKER ON NEW OPERATION

PART - Wages Sheet. OPERATION - Preparing.

Important Steps in the Operation Step - A logical segment of the operation which substantially ADVANCES the work.	Key Points Key point - Anything in a step that might: Make or scrap the work. Injure the worker. Make the work easier to do - i.e., "knack", "trick", special timing, bit of special information.
1. Prepare forms	All edges even. Carbons correct. 3 copies.
2. Insert forms in typewriter	Use guide. Check alignment.
3. Fill in heading ...	Page of how many. Wage period.
4. List particulars ...	Surname first, initials. Surnames alphabetical by grades. Basic rate.
5. List gross amount earned ...	Personnel records. Check.
6. List deductions ...	Superannuation. National Insurance. P.A.Y.E. Others
7. List net amounts due ...	Gross amount (5) minus deductions (6). Check.
8. List remarks	Personnel records.
9. Total columns	Check adding machine tape.

An office supervisor did this break-down in 7 minutes.

The supervisor used this break-down "as it is" for employees with some previous office experience. For new employees some of these steps could be a separate Training Task with its own Training Task Breakdown.

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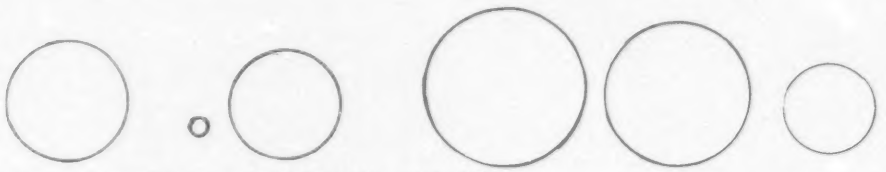
LEARNING SEQUENCE FOR DIFFICULT OPERATIONS

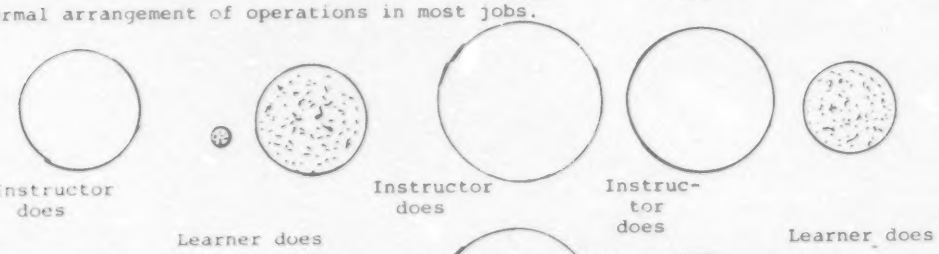
Few jobs have their working sequence arranged in an order of increasing difficulty, as shown at the top of the chart. Instead, the difficult units of the job are usually mixed in with the easy ones, like the second line on the chart. These steps have to be done on the job in the correct order, and therefore they should be learned in that order. What can the instructor do? He can keep the job in proper sequence and still teach the easier units first by setting up his teaching plan as shown by the dark spots in each row of the chart. The instructor does the difficult, or white, spots while the learner does the easy, or shaded, spots, thus maintaining a learning sequence even in a difficult or long operation. By a joint Trainer-Learner effort being expanded in this manner an effective learning climate is created and difficult tasks are mastered by the learner in ecord time.

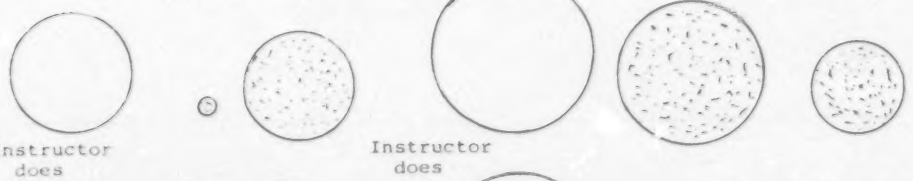
1.

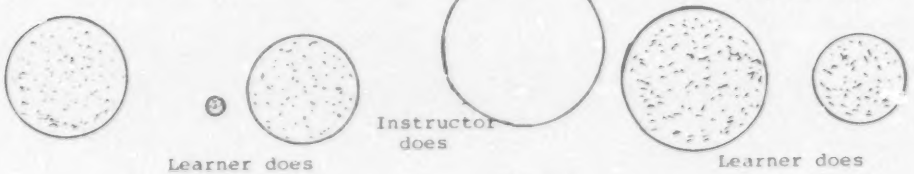
Operations arranged in good teaching sequence-easy to difficult, few jobs however have their working sequence so conveniently arranged.

2. 

Normal arrangement of operations in most jobs.

3. 

4. 

5. 

6.

CONFIRMATION RECORDING AND ADMINISTERING

PART 7

ELEMENTS PRESENT IN THE JOB-INSTRUCTION SETTING

COMMUNICATIONS, MOTIVATION AND HUMAN RELATIONS

TEN PRINCIPLES OF GOOD JOB-INSTRUCTION

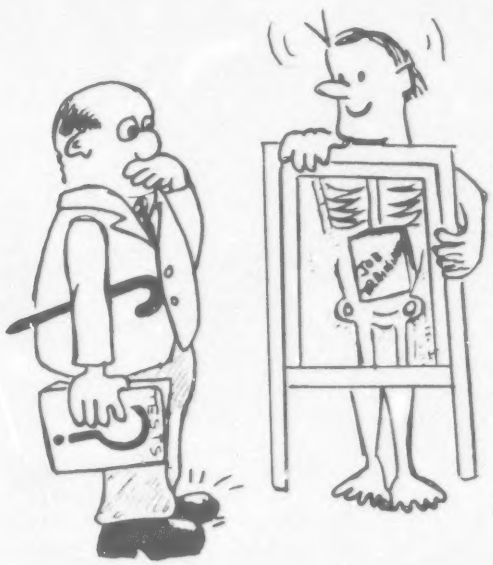
INSTRUCTIONAL METHODS

AIDS TO THE JOB-INSTRUCTION

TACKLING THE JOB-INSTRUCTION

CONFIRMING, RECORDING AND ADMINISTERING THE JOB TRAINING

we are here



1. Confirmation
2. Fault recognition and analysis
3. Administration associated with job-instruction

1 CONFIRMATION

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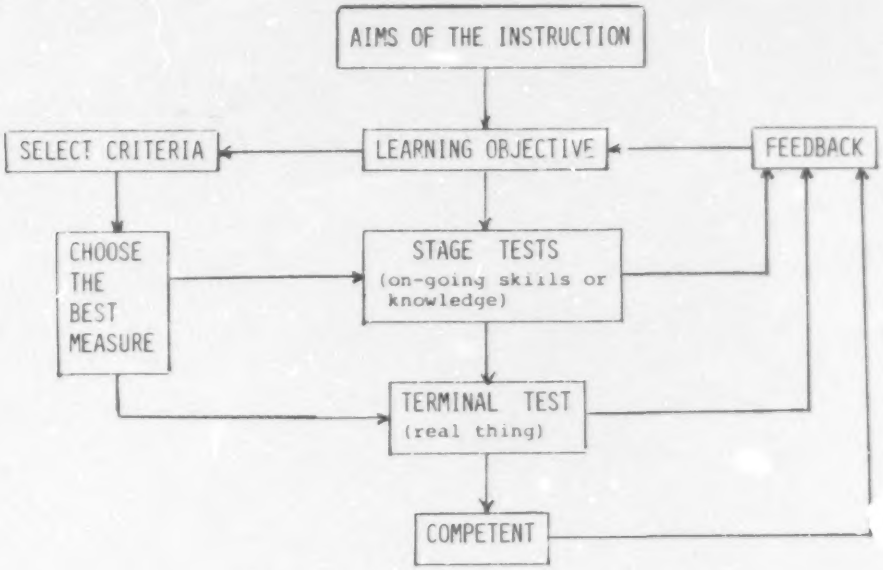
INTRODUCTION

In earlier parts of this handbook we discussed the importance in stating the aims of our training, and of setting objectives that stated just exactly what we wanted the trainee to do at the end of the learning period. Now that we have seen the steps in setting up the training, and carrying it out, we must ensure that the trainee really learned. This can be done by Testing the learning.



TESTING PROCESS FOR JOB INSTRUCTION

TESTING 'THE PRODUCT'

Testing involves the *criterion measurement* of whether learning has been accomplished. The aim of testing in the job-training setting is to:

1. Confirm the set standard has been reached.
2. Measure the level of performance in relation to the set standard.
3. Assist in deciding on what extra training is required
4. Predict the future development of the trainee.

In addition a test will, if it is well designed, help a trainee to:

1. Confirm that the learning objective has been achieved.
2. Feel a sense of satisfaction through achievement.
3. Identify strengths and weaknesses.

PRINCIPLES OF CRITERION MEASUREMENT

These principles are not hard and fast rules. Nevertheless, they should be observed when measuring the learner's performance:

1. If at all possible, directly measure the outcomes specified by the learning objective.
2. If direct measurement is *not* possible, the measure must simulate the real performance.
3. Include *all* the elements described in the learning objective.
4. Never include elements not called for by the learning objective.

DIRECT MEASUREMENT OF PERFORMANCE

Since excellent on-the-job performance is the underlying goal of our training, all testing should parallel as closely as possible to the *real thing*. If a trainee was trained to take a patient's temperature using a thermometer, the most appropriate way to check if the skill had been learned would be to provide the instrument and a patient, and see. This is what is meant by direct and criterion measurement.[1]

In vocationally related training such testing should be relatively easy to develop. Rather than give a 'pencil and paper' test to *ask* a question *about* a skill, it's far more desirable to measure directly what the trainee does. However, even in the on-the-job training setting, it may be necessary to test knowledge facts with a written or oral response.

EXAMPLE 1.

LEARNING OBJECTIVE:

EXAMPLE 2 shown on page 71.

CRITERION & DIRECT TEST:

Goods to the following value have just been sold across the counter - Item: A $11.23
B $1.55

The till contains: $20, 10, 5, 2, and 1 dollar bills,
and $0.50, 0.20, 0.10, 0.05 and 0.01 coins.

Give the correct and bal ced change to a customer handing ove.: (1) A $20 bill
(2) A $10 and $5 bill.

EXAMPLE 2.

LEARNING OBJECTIVE:

Upon completion of this step of instruction, the trainee will use a multimeter Type AVO8 to measure, without assistance or reference, the voltages of 3 dry cell batteries, in two minutes and record these voltages with no more than 5% error.

CRITERION & DIRECT MEASURE:

An AVO 8 multimeter, 3 dry cells and a recording card are provided. Determine the voltages of cells A. B. & C. and record them on the appropriate blank on the card. Measure carefully using the correct scale to keep the error to 5% or less. You have 2 minutes.

1. *The term 'criterion test' may be new to many readers, it simply means 'a standardized objective judgement' of a trainee's performance. If all the principles of criterion measurement are adhered to, the best possible test of performance will result. Above all, a 'criterion test' compares a trainee against the job performance required not against other trainees or workers.*

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EXAMPLE 3.

LEARNING OBJECTIVE:

Training Task Breakdown Sneet JB(6), shown on page 75.

CRITERION & DIRECT MEASURE:

The trainee is to be working on the Type L4 press mold and preparing to complete stage 6 of the handpiece molding operation. The trainee is to correctly, safely and in a total of 5 minutes, remove and inspect 4 completed handpieces. Company Operating Procedures must be followed at all times. Machine defects will automatically cancel the test.

CRITERION OR DIRECT MEASURES OF PERFORMANCE MUST NOT INCLUDE ELEMENTS WHICH ARE NOT PART OF THE INSTRUCTIONAL OBJECTIVE. HOWEVER, ENSURE THAT ALL ELEMENTS THAT ARE DESCRIBED ARE INCLUDED.

INDIRECT MEASUREMENT

If direct measurement is not possible, the measure used to test that learning has been satisfied, must simulate the real thing as near as possible. To do this you must carefully look at the elements of the learning objective and simulate, cost effectively, the real setting.

It should not have escaped your notice, through reading the learning objectives and criterion measures, how the aim becomes the learning objective (using the four principles stated on page 70) and then *performance* stated in the objective is directly measured in the "real world". This is why any effort expended on producing the INSTRUCTIONAL AIM and LEARNING OBJECTIVE is well worth it. It is particularly helpful when an indirect measure is required.

EXAMPLE 1.

LEARNING OBJECTIVES:

Example 2 shown on page 71. (Assume this was learned by a group of trainees away from the retail setting).

CRITERION OR INDIRECT MEASURE:

Assume you are working in a petrol station and have just finished pumping $11.23 worth of 'premium' and added ½ litre of oil that cost $3.10 per litre. The customer hands you the following bills:

(1) $20.00 bill, or

(2) $10.00 bill and $5.00 bill.

Write the number in front of the different pieces of money you would return:

TEST (1)		TEST (2)	
... $10	... $0.50	... $10	... $0.50
... $5	... $0.20	... $5	... $0.20
... $2	... $0.10	... $2	... $0.10
... $1	... $0.05	... $1	... $0.05
	... $0.01		... $0.01

EXAMPLE 2.

LEARNING OBJECTIVE:

Upon completion of this stage of instruction the trainee is to recall the eight elements of the direct current electrical system of a standard 6 cylinder motor car. Starting with the battery and ending with the spark plugs.

CRITERION OR INDIRECT MEASURE:

List in order, the 8 elements of the direct current electrical system of a standard 6 cylinder car. The first and last elements have been given to you, credit will only be given for the remaining 6 elements.

1. Battery
2. .....
3. .....
4. .....
5. .....
6. .....
7. .....
8. 6 Spark Plugs

METHOD OF ELICITING AND PRODUCING RESPONSE MUST BE DESIGNED TO REDUCE SUBJECTIVE JUDGEMENT ON THE PART OF THE LEARNER AND EXAMINER.

SOME PRACTICAL HINTS

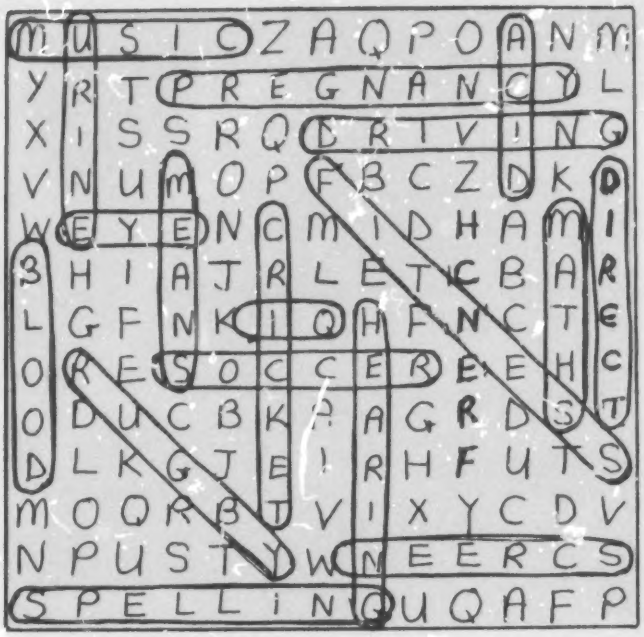
Designing Tests

1. Decide on the aim of the test and its scope.
2. Ensure the test covers all the elements of the training objective, do not include anything which is not part of the learning objective.
3. Direct or Indirect measurement?
4. What type of response is called for?
5. Real thing if possible, if not - make it stimulate and simulate.

Conducting Tests

1. Let the trainee know in advance the test is to take place.
2. Confirm the trainee knows the standard required, preferably have a copy of the learning objective.
3. Where ever possible combine practical and oral testing in order to confirm knowledge and skills.
4. Conduct tests fairly, avoid statements like "assume this is happening, etc."
5. Let people know how they are going and a final result if possible. Discuss strengths and weaknesses. In this way the test becomes a learning experience.

TYPES OF TESTS


M U S I C Z A Q P O A N M
Y R T P R E G N A N C Y L
X I S S R Q D R T V I N G
V N U M O P F B C Z D K D
W E Y E N C M I D H A M I
B H I A J R L E T C B A R
L G F N K I Q H F N C T E
O R E S O C C E R E E H C
O D U C B K A A G R D S T
D L K G J E I R H F U T S
M O O R B T V I X Y C D V
N P U S T Y W M E E R C S
S P E L L I N G U Q A F P

There are many types of tests varying from simple ones used during instruction to more comprehensive tests required at various stages of a lengthy period of training. The mechanics of designing indirect measures, such as written answer tests, is beyond the scope of this handbook. Furthermore, it is probably unnecessary for the on-the-job instructors to concern themselves unduly with this subject. If further information is required on this subject, it could be obtained through respective Industry Training Board Training Officers, or by obtaining a copy of the following reference[1], which is an excellent practical guide on Testing and Examining in the vocational setting.

REMEMBER THE CLUE TO MEASURING PERFORMANCE LIES IN THE LEARNING OBJECTIVE.

PRACTICAL-DIRECT: TO TEST SKILLS AND TECHNIQUES

ORAL, OBJECTIVE WRITTEN: TO TEST KNOWLEDGE FACTS

WHEN TO TEST

No hard and fast rules exist on the best time to test. It is a matter of logical balance. Tests may be simple ones within the instructing session or a major one at the end of the job training. In either case, their complexity apart, testing should be carried out as follows:

1. At the beginning of training - to find out what is known. The trainee may already be able to meet the task/step learning objective. To waste time and effort in

1. *Allan Jones, and Peter Whittaker: "Testing Industrial Skills", Gower Press, 1975. (ISBN 0-7161-0278-1)*

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further training may be unnecessary.

2. After each stage of instruction - to confirm the stage has been mastered before moving on to the next.
3. At the end - to see if the aim of the instruction has been achieved.
4. Subsequent test - to see that the standard is being maintained.

TEST	
AT THE START	- as a foundation
BY STAGES	- to determine progress
AT THE END	- to confirm
LATER	- to see if it is maintained

SELF ASSESSMENT

In part 6 we saw that self-preparation was as important as preparing the learner. Likewise, self assessment serves a useful purpose. It is not intended for "cleansing the soul", but to constructively evaluate the instruction given. This is simply achieved through the use of a 'memory aid', which should be completed at the end of the instruction. (Appendix 1).

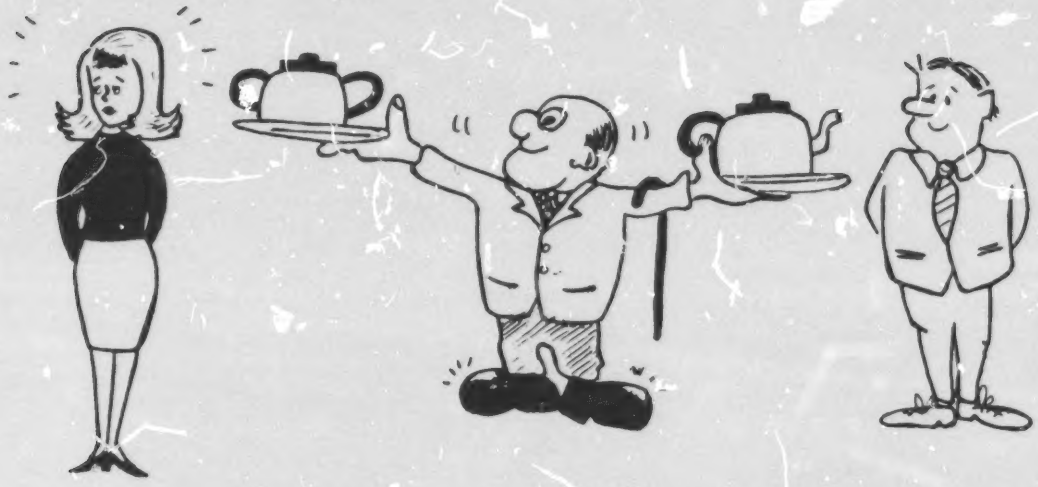
A FINAL POINT ON CONFIRMATION

Confirmation of the effectiveness of training, particularly that done away from the job-setting, often goes along these lines:

BOSS: "How did the three day course go, Sally?"
SALLY: "Oh, it was terrific we all enjoyed it - great fun."
BOSS: "Excellent, I am glad it was a success..."

Enjoyment must not be confused with effectiveness, unless enjoyment was the learning objective of the course! Nevertheless, there is evidence to suggest that an enjoyable course of instruction is more likely to have positive effects than one that fails on this score.

2 FAULT RECOGNITION AND ANALYSIS



INTRODUCTION

Good quality is an abstract thing, what it means to the trainee has to be expressed in recognisable, acceptable and understandable terms. Though standards are set in industry, commerce and distribution in an endeavour to maintain good quality, one of the most difficult tasks in training is achieving recognition of the right quality standards. There are many instances when functional requirements are attained but the *quality* standards could be improved, e.g. the finish of a work piece, the packing of a parcel, trimming left ragged, hammer marks, and so on. Examples could be found in almost every aspect of industry and commerce.

DEFINITION

FAULT RECOGNITION AND ANALYSIS IS A MEANS OF IDENTIFYING THE FAULTS WHICH OCCUR IN AN OPERATION, DETERMINING THEIR CAUSE AND EFFECT, REMEDY AND PREVENTION IN THE FUTURE.

FAULT RECOGNITION AND ANALYSIS PLAN

The process involves answering the following planned sequence of questions:

1.	Name	Identify the fault by name.
2.	Appearance	How is the fault recognised?
3.	Cause	What are the causes of the fault in the order of most probable occurence?
4.	Effect	What is the effect of the fault on the component, following operation(s), and/or end product?

5. Responsibility Who is responsible for the fault having occurred?

6. Action What action should be taken on detecting the fault?

7. Prevention How can similar faults be prevented?

THE PURPOSE OF USING FAULT RECOGNITION TECHNIQUES

Experience is claimed by many to be the only teacher, but by following the simple pattern of fault recognition the instructor can use standards that can be recognised, measured, and assessed through the use of the senses. The conclusions reached enable the trainee to initiate the required follow-up action, either in self-correction or by communicating to the instructor.

USING RECOGNITION OF THE FAULT IN TRAINING

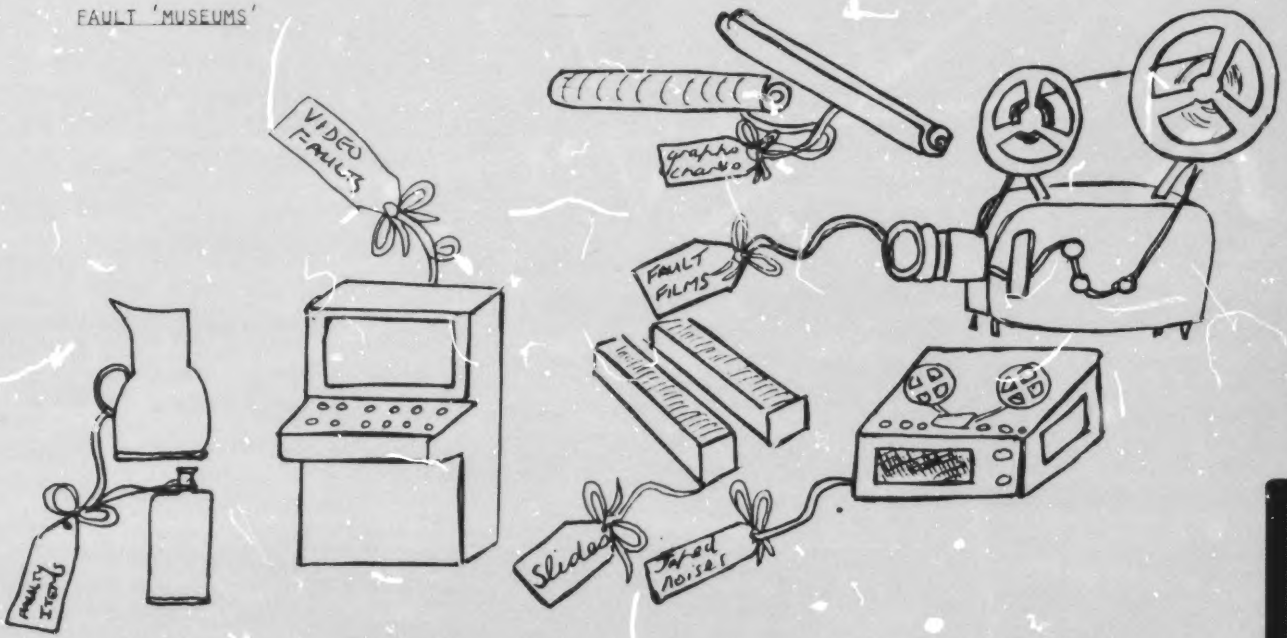
By using a questioning technique set around recognition (appearance of the fault) the instructor can develop perceptual skills in the trainees. In as much, what is seen, heard, or felt can be used to make a decision that will set personal standards for future recognition of the fault. Often more than one sense is involved in fault recognition and guided practice will enable the learner to reach more quickly a 'feel' for the correct standard.

USING ANALYSIS OF THE FAULT

Applying a similar technique with questions focussed on analysis (cause of the fault) the instructor can direct the trainee to find the root cause. A number of causes could possibly be responsible for the fault, the questioning technique will enable the trainee to chose the correct one, and suggest the remedial action required.

Time spent considering the question of effect the cause will have on subsequent steps in the operation, will exercise the trainees powers of reasoning. Furthermore, it will show clearly why the fault must be corrected.

FAULT 'MUSEUMS'



This is a very useful way of developing the trainee's sense of fault recognition. Forms of visual aids that could be considered are wall charts, pictorial representation on film strip; a number of faulty work pieces, ranging from the totally unacceptable, then graduated to those of an acceptable standard. These aids used in an exercise help the trainee to recognise a standard to aim for. If each time a new fault occurs a sample of the fault were to be put in the museum, the instructor would acquire a valuable store of visual aids in quality recognition.

Examples of Fault Recognition and Analysis records are shown as appendices to this part of the handbook. Appendix 2 shows a general form of record sheet. Appendices 3 and 4 show a method of Fault/Cause and Fault/Responsibility recording.

FAULTS WILL OCCUR DURING TRAINING AND OPERATING.

FAULT RECOGNITION AND ANALYSIS ENSURES WE LEARN FROM OUR ERRORS

3 ADMINISTRATION ASSOCIATED WITH JOB INSTRUCTION

INTRODUCTION

In most organizations the responsibility for on-the-job training, will be assigned to the instructor by a manager or training supervisor. It is therefore assumed that most instructors are responsible for:

- Giving the instruction.
- Confirming the training effectiveness.
- Keeping the basic *records* and making *reports* in their area of responsibility.

The first two areas have been dealt with in Parts 6 and 7 of the handbook, this section will cover points of interest in the third.

THE PURPOSE OF KEEPING BASIC TRAINING RECORDS

The purpose of keeping a basic training record is to;

1. Create and maintain dependable information on the planning and preparation for training.
2. Monitor the progress of individual trainees.
3. Produce a final report on individual trainees, to provide accurate and just decisions as to their current abilities and future development.

INSTRUCTORS TRAINING RECORD BOOK

Many larger organisations have their own methods of keeping personal records and where reports on training are called for the instructor should comply with these. Nevertheless, job-instructors should keep a basic set of records of the training in their area of responsibility. All that is needed to meet this requirement can be stored in Ring Storage Files (Record Book) of the type shown in Appendix 5.

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The book should include the following information:

SECTION 1
- Job Descriptions
- Statements of the overall training aim and consequences on not achieving it.

Keep together and store in logical sequence e.g. JB1, JB2, etc.
- Job Breakdowns
- Training Task Breakdowns
- Confirmation Methods

SECTION 2
- Training timetables/plan:
  - Block
  - Group
  - Individual

SECTION 3
- Training Records:
  - Individual
  - Department (format company policy)

SECTION 4
- Miscellaneous
  - Notes
  - Aids
  - Contacts etc.

Examples of these are shown in Appendices 6 to 9, but however, the final format is entirely an individual instructor's choice. The golden Rule is *Whatever form they take, they must be maintained if they are to serve any useful purpose.*

ASSESSING AND REPORTING ON APPRENTICES

A special mention needs to be made of trade apprentices, for on-the-job instructors frequently have an input into trade training, assessing and routine reports.

ASSESSMENTS

These may be made either on a basis of the observation that normally accompanies good supervision or by means or pre-determined tests or by a combination of both.

The assesment may affect the career of the apprentice and therefore it must be thorough and comprehensive.

Assessment arising from daily observation must take note of:

1. The point at which it is logical to begin the assessment e.g. reception of verbal or other instruction prior to commencing a job.
2. Forethought and planning.
3. Preparation of workplace and equipment.
4. Tidiness and dexterity whilst carrying out the job.
5. Safety.
6. The end result.

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Assessment by means of tests are usually appropriate to:

1. A need to measure ability and accuracy against a precise standard.
2. Assessing apprentices' ability to work under stress conditions. Chatting with colleagues, getting help from others etc., are deliberately made impossible in order to test unaided ability.

WRITTEN REPORTS

Convey the most useful information if they are concise and fair to the individual.

Critical remarks and opinions should be supported by relevant facts.

Some organisations also welcome an indication of apprentices' potential in the various fields of employment open to them.

A well-written and informative report is a measure of an instructor's ability to give information to those who may further the progress of the apprentice.

WORK RECORDS AND LOG BOOKS

Work records exist for most current apprenticeships, and are available through respective Industry Training Boards. As part of the contractual agreement, associated with the 'signing up' of an apprentice, is the obligation to maintain a record of training and experience. The fundamental principles of well-written reports applies equally to these records. Above all *they must be maintained*, for they form a valuable record of the apprentice's performance, should this ever be questioned.

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SUGGESTED MEMORY AID
FOR SELF ASSESSMENT OF INSTRUCTIONAL TECHNIQUES

SELF ASSESSMENT FORM

JOB: DATE:

PRINCIPLE INVOLVED	SATISFIED YES	SATISFIED NO	REMARKS
1. THE AIM: a. Kept in continuous view. b. The standard required.			
2. PLANNING & PREPARATION: a. Was it sound and thorough? (1) Aids (2) Stages			
3. INTEREST: a. Was the learner stimulated? b. Keeness to continue.			
4. USE CORRECT SENSES: a. Maximum use of doing for skills. b. Maximum use of sight for knowledge facts.			
5. ACTIVITY: a. Sufficient equipment. b. Sufficient practice.			
6. SIMPLICITY: a. Simple and clear. b. Logical sequence.			
7. HUMAN RELATIONS: a. Motivation obvious. b. Enthusiasm & confidence. c. Fair, firm & helpful.			
8. CONFIRMATION: a. Each step understood. b. Skills - by practical. c. Knowledge - by questions. d. Mistakes highlighted.			
9. JOB KNOWLEDGE: a. Did I have sufficient to carry out the Instruction? b. Did I have to use another skilled worker?			
10. SUCCESS: a. Was the instruction successful? b. Why or why-not?			

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SUMMARY OF FAULT ANALYSIS - MANUFACTURE PLACE FOR SUPPORT BRACKET						
NAME	APPEARANCE	CAUSE	EFFECT	RESPONSIBILITY	ACTION	PREVENTION
UNDERSIZE HOLE	Diameter of hole too small. 'Go' end of gauge will not enter.	1. Incorrect drill selected. 2. Worn drill.	Component cannot be assembled	Operator	Change drill Re-drill to correct size.	Check size and condition of drill before fitting.
OVERSIZE HOLE	Diameter of hole too big. 'No go' end of gaugh enters hole.	1. Incorrect drill selected. 2. Blunt drill 3. Build up of swarf on drill point. 4. Drill ground off centre. 5. Worn bush plate. 6. Worn drill spindle.	Component scrapped.	1. Operator 2. Operator 3. Operator 4. Cutter Grinder 5. Fitter 6. Fitter	Inform foreman and complete scrap record. 1. Change drill 2. Change drill 3. Change drill 4. Change drill	Check size and condition of drill before fitting. Operator cannot prevent 5,6.
DRILL RUN	Hole not vertical. Detected by inspection Fixture No. 6723/4/F	1. Feed rate of drilling too high. 2. Drill too long for job. 3. Swarf between component and vice. 4. Component not hard down on bottom of vice. 5. Worn bush plate	Component scrapped	1. Operator 2. Operator 3. Operator 4. Operator 5. Fitter	Inform foreman and complete scrap record. 1. Change drill 2. Change drill 3. Change drill 4. Change drill	1. Ensure swarf is not discolouring whilst drilling. 2. Drill not to be longer than 15cm. 3. Clean fixture before loading. 4. Press down on component whilst clamping. Operator cannot prevent 5.
TAPERED HOLE	Diameter of hole larger at one end than other.	1. Worn drill 2. Blunt drill 3. Worn drill spindle 4. Worn bush plate	Component scrapped.	1. Operator 2. Operator 3. Fitter 4. Fitter	Inform foreman and complete scrap record 1. Change drill 2. Change drill	Check size and condition of drill before fitting. Operator cannot prevent 3,4.

FAULT/CAUSE ANALYSIS CHART

FAULTS

CONCRETE PIPE QUALITY ANALYSIS	FAT SEAMS	CHIPPED SPIGOTS	CHIPPED FAUCETS	ROUGH BORES	ROUGH OUTSIDES	ROUGH FAUCET END WALL	POOR REAMING	WASHED OUT COLLARS	REINFORCEMENT SHOWING	GOUGED INSIDES	BONY ENDS	MOULDS ENDS STICK	STEPPED SPIGOT SEAM	OVER FILLED
MOULDS NOT BOLTED	X													
FAULTY HOISTING		X	X											
POOR BARWORK				X										
NO OIL IN MOULDS				X	X	X						X		
REAMING						X								
WRONG MIX							X							
TILTED WRONGLY IN STEAMER								X						
MOULDING									X					X
FAULTY HOISTING										X				
DIRTY MOULDS											X	X		
INCORRECT ASSEMBLY OF MOULD													X	
BROKEN WORK DOWEL DAMAGED MOULD													X	

CAUSES

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FAULT LOCATION ANALYSIS - EACH BREAKAGE RECORDED

(as used by an instructor to pin-point the specific training needs of individuals to enable corrective training to be given.)

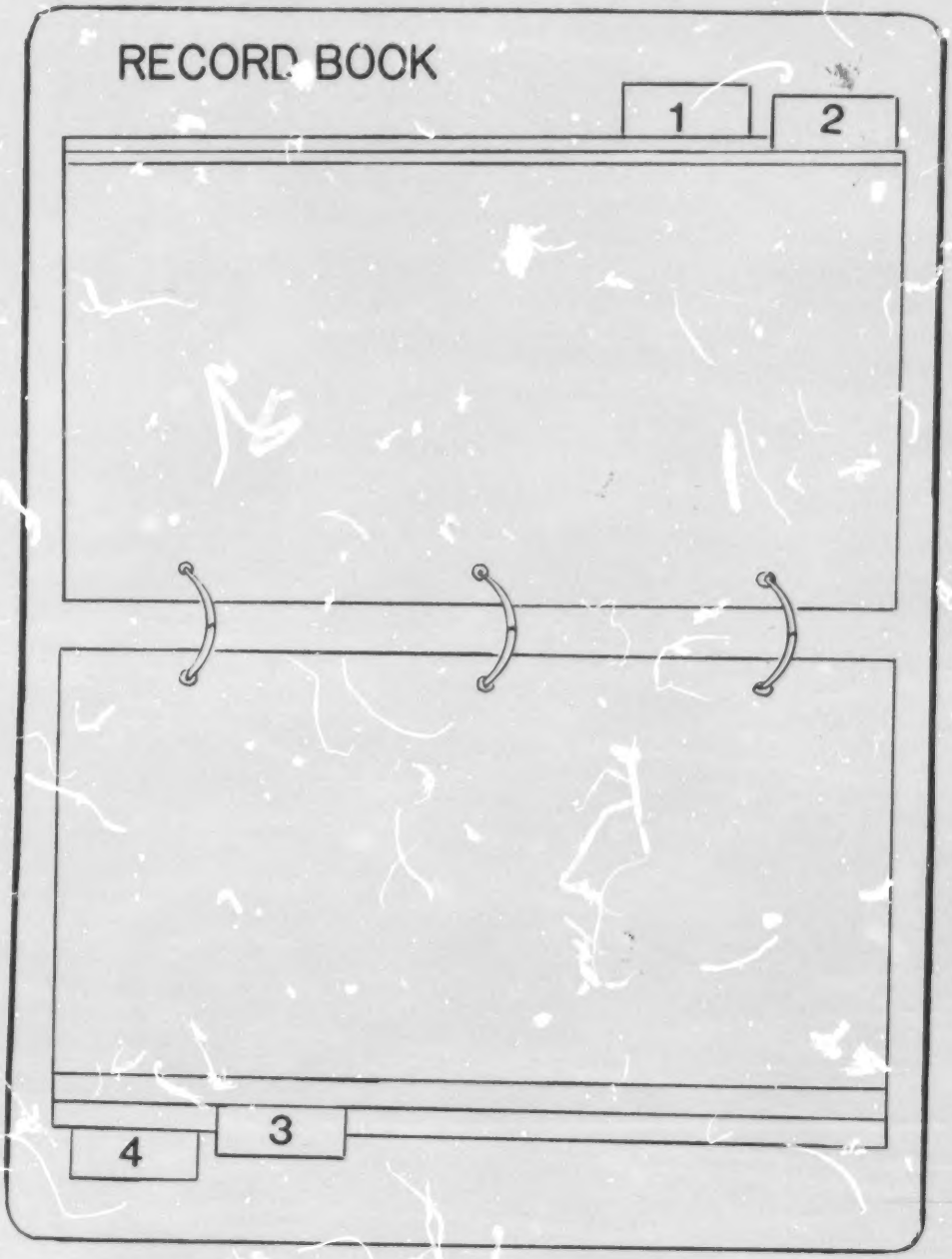
KEY:
/ equals one breakage
S equals skill error
K equals knowledge error

POSSIBLE CAUSES

MACHINE OPERATORS

JOB: EASTWOOD LAPPING MACHINE OPERATOR FAULT UNDER STUDY: Breakages before end of production. DATES: 2/4/81 - 6/4/81	TWEEZERS - USE OF	FINGER HANDLING	UPPER LAP MOVEMENT	WASHING	DRYING	PLACING IN FREQUENCY HOLDER	DROPPING ON FLOOR	CARRIER SIZE AND SHAPE	DRYNESS OF LAPPERS	GRINDING MIXTURE	INDIVIDUAL TOTAL
JIM	//// SSKS	////// S		/// S	///// S	/// S	/// S		/// KSS		28 - 27S 1K
TOM						/// S	S //				6 - 6S
BILL			///// K	/// K		///// S	S ///		/// KKK		19 - 11K 8S
EDDIE		/// S				/// S	S ///				11 - 11S
JOE						S ///	S ////	K /////			12 - 7K 5S
TEAM TOTALS	3S 1K	8S	5K	4S 3K	5S	21S	16S	5K	5K 1S	0	76 - 57S 19K

APPENDIX 5



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SAMPLE BLOCK TIMETABLE

BLOCK TIMETABLE FOR: PLASTICS MOLD OPERATOR

DEPT: Plastic Molding (47) TRAINEE(S): Smith, T., Jones, A. PERIOD: February '82 - March '82

JOB BREAKDOWN	TOPIC	WEEKS 1	2	3	4	5	TOTAL HRS	REMARKS
JB4/JB5	Safety	JB 4 (1)-(7)	JB 5 (1)-(7)	JB 4 (5)	JB 5 (5)	OPERATING ALONE AND FINAL CONFIRMATION	8	Stressed throughout.
" "	Cleaning Molds	JB 4 (1)	JB 5 (1)	-	-		12	
" "	Lubricating			JB 4(2)	JB 5(2)		8	Brush and spray.
" "	Placing Inserts		JB 4(3)	JB 5(3)			2	
" "	Mold Operation			JB 4(4) JB 4(5)	JB 5(4) JB 5(5)		16	Watch for fatigue in this area.
" "	Inspections	JB 4(6)	JB 5(6)				14	
" "	Packaging and Storage			JB 4(7)	JB 5(8)		4	
	NORMAL INSTRUCTION TIME (HRS)	15	20	17	12		64/64	Last week still carefully supervised.

KEY: JB 4 equals Job Breakdown 4
JB 4(1) equals Job Breakdown 4, step 1 and associate Training Breakdown sheet.

NOTE: Can be used for shorter training periods broken down on a daily basis.

SAMPLE GROUP TRAINING TIMETABLE / PLAN

GROUP TRAINING TIMETABLE OR PLAN

JOB TITLE: Mold Operator
PERIOD: Feb 82 - Mar 82
DEPT: Plastic Molding (47)

REFERENCES:
JB 4 & JB 5

TRAINEES NAMES / JOB OPERATIONS	Cleaning Molds & Safety	Lubricating & Safety	Placing Inserts	Mold Operation & Safety	Inspections & Safety	Packaging & Storage					REMARKS
John Hurd	/	/	/	/	/	/					Fully trained. Can instruct if required.
Mary Clements	/	/	/	6/4	/	/					Competent worker.
Joan Williams	/	/	/	/	X	X					
Alex Symonds	/	X	X	X	14/3	16/5					To replace worker retiring.
Bill Barnes	/	/	/	6/4	1/7	/					
Bob White	/	8/3	24/3	X	X	X					New Employee.
IDEAL CAPACITY	9	7	7	6	3	3					/ Worker can do.
ACTUAL CAPACITY	10	6	6	4	3	4					X Does not need to know.
DEPT STATUS	+1	-1	-1	-2	EVEN	+1					6/4 etc. Date needed by.
											+ or - Depts status.

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SAMPLE INDIVIDUAL TRAINING TIMETABLE

INDIVIDUAL TRAINING TIMETABLE

NAME: Mary Clements JOB: Mold Operator

DEPT: Plastic Molding (47) PERIOD: Feb 82 - date

JB No.	TASK/ STEP	HOW DETERMINED	DATES START	DATES CONFIRMED	REMARKS
JB 4	(4)	Employee asked to be moved to new department operation, supervisor agreed.	6/4	12/4	Now competent in all aspects of department operation. Consider for Leading Hand.
JB 4	(5)				
JB 5	(4)		13/4	19/4	
JB 5	(5)				

FURTHER NOTES & COMMENTS

DATE	
20/4	Suggested L.H. opening coming up might be of interest, think it over.

Note: A form designed on similar lines will serve equally as well as an Individual Training Record.

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EXAMPLE: GROUP/DEPARTMENT TRAINING RECORD

APPENDIX 9

DEPARTMENT: _____

MANAGER/SUPERVISOR: _____

DATE: 3.1.67 REVISED ON: 5.3.67 10.9.67 2.1.68

INITIAL & NAME	SERVICE			OTHER DEPTS	JOBS						COURSES					REMARKS
	In ind	In firm	In dept		A	B	C	D	E	F	St Johns	Acc S	VTC S	VTC BI		
J White	14	10	8		//	//	//	//	//	//	c	c	c	c		Retires 15.9.68
S Brown	10	5	5		// T 1/5	// T 1/6	/	/	/	//	c		c			Replace White Train by 1/5
R Green	3	3	3		/P T 1/5	/	/ T 1/5	//	//							Safety Rep.
T Black	2	1	1		//	/	T 15/5	/	/							On Course 8-15/2/68
M Blue	3	2	1		/P T 1/5		/P T 1/4				c			c		Transfer if no improvement.
F Pink	5	1	1		/						c					Joined 1/1/68.
																2 extra men needed for job C by 1/5/68

/ Some exp., // Fully able to do the job, c Completed course, T1/5 Train by 1st of May.

DEPARTMENT TRAINING RECORD

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NOTES

EPILOGUE

Well done! Some compliment should be offered if you have indeed conscientiously reached this point. There are a couple of things we can safely assume at this juncture. First, much of what you have read in this handbook is not new to you. Second, some of it you will probably disagree with. Our aim was not to imitate other material on this subject, but to emulate it in an interesting New Zealand presentation. Hopefully, some of it was both interesting and helpful to you.

But don't stop here!

Now is the time to try out what you have read and to apply the new knowledge you have gained. Use your own initiative and creativity to discover things that the scope of this handbook precluded being written - the many ways of increasing your ability to instruct others how to do their job. Your efforts will be greatly appreciated, and that will be appreciation well deserved.

ACKNOWLEDGEMENTS

This job-instructor's manual has been prepared by Peter Mason, who was contracted by the New Zealand Vocational Training Council to design and develop a comprehensive programme to train part-time instructors in industry and commerce.

A project such as this, while prepared by an individual, is, of course, the result of assistance given by many people and organisations - especially members of the Instructor Training Working Group. Where appropriate, specific acknowledgements are expressed in the text. However, in particular, the following sources of information and assistance are gratefully acknowledged:

- Principles and Practices of Good Instruction, Royal Signal Handbook (U.K.).
- Chemical and Allied Products Industry Training Board (U.K.).
- Royal New Zealand Air Force Teaching Practice School.
- The Food, Drink and Tobacco Industry Training Board (U.K.).
- Industrial Training Service, N.Z. Department of Labour.
- Engineering Industry Training Board.
- Apparel Industry Training Board.
- Distribution Industry Training Board.
- United Kingdom Department of Employment - Instructors Training College.
- Institution of Electrical & Electronics Incorporated Engineers - Bulletins on Training.

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